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Twenty-second Annual Report

OF THE

PENNSYLVANIA

Department of Agriculture

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PENNSYLVANIA
DEPARTMENT OF AGRICULTURE

OFFICIAL LIST, 1916

C. E. PATTON, Secretary,
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C. E. CAROTHERS, De'p Sec'y and Director of Farmers' Institutes,
Washington, Washington County.

M. D. Lichliter, Chief Clerk,
Bellevue, Allegheny County.

E. C. FIRST, Clerk, Farmers' Institute Bureau,
Harrisburg.

BERTHA H. SIEBER, Stenographer.
Harrisburg.

J. FRANK ZORTMAN, Messenger,
Etters, York County.

JAMES FOUST, Dairy and Food Commissioner,
Altoona, Blair County.

MAY V. RHONE, Clerk, Dairy and Food Bureau,
Center Hall, Centre County.

WILLIAM R. SWARTZ, Messenger, Dairy and Food Bureau.
Duncannon, Perry County.

J. G. SANDERS, Economic Zoologist,
Harrisburg.

(PROF. H. A. SURFACE resigned as Economic Zoologist,
August 15, 1916.)

P. T. BARNES, Assistant Economic Zoologist,
Harrisburg.

V. A. E. DAECKE, Clerk, Bureau of Economic Zoology,
Philadelphia.

KATHRYN P. FIRST, Stenographer, Bureau of Economic Zoology,
Harrisburg.

J. C. SIMMONS, Messenger, Bureau of Economic Zoology,
New Cumberland, Cumberland County.

C. J. MARSHALL, State Veterinarian,
Philadelphia.

T. E. MUNCE, Deputy State Veterinarian,
Washington, Washington County.

RUSSEL T. WHITSON, Clerk to State Veterinarian,
Lancaster, Lancaster County.

ADELINE V. GREATHEAD, Stenographer to State Veterinarian,
Harrisburg.

JAMES W. KELLOGG, Chief Chemist,
Harrisburg.

G. G. HUTCHISON, General Agent.
Warrior's Mark, Huntingdon County.

L. H. WIBLE, Statistician,
McConnellsburg, Fulton County.

J. HERBERT THOMAS, Chief, Bureau of Disbursements,
Harrisburg.

W. R. DOUGLASS, Publicity Director,
Harrisburg.

H. E. KLUGH, Clerk of Fertilizer Control,
Harrisburg.

TWENTY-SECOND ANNUAL REPORT

OF THE

SECRETARY OF AGRICULTURE

To His Excellency, Martin G. Brumbaugh, Governor of Pennsylvania:

Sir: In compliance with the Act of Assembly, creating a Department of Agriculture of Pennsylvania, I have the honor herewith to submit my report of said Department for the year 1916.

THE CALL OF COUNTRY LIFE.

There is no problem which is more keenly projecting itself into the social consciousness and conscience today than that of the rebuilding of country life. The desertion of the country for the great industrial centers by the bright and stalwart young men, which has been so marked the past decade, has stirred the economists of our day who are devoting their attention to the solution of the problem. In fact, the National Government has realized the seriousness of the problem and is studying every phase of the subject and is spending millions of dollars and engaging from five to six thousand men in repairing the waste places on the farm; and is seeking improved means of reviving the farming industry, especially in the more interior and sparsely settled communities.

The task is a serious one; for rural life, to induce men to stay or return from urban and industrial centers, *must be made more economically profitable than urban life. In other words,* rural *life must be made more humanly interesting and more richly enjoyable.* So long as there are better schools, better churches and better facilities for social recreation in the cities, so long will men flock to the great centers and larger towns. So long as the popular sentiment exists that the country preacher and the country teacher are inferior to the city preacher and the city teacher, so long will men abandon the one and suffer every privation to place themselves within easy reach of the other.

It is a grave charge, yet, nevertheless, it is true, that the State nor the Church has dealt fairly with the farmer. They have failed to pour the best blood into his life. No one expects to find in the country the best preacher nor the best teacher; in fact, the ministers and the teachers are in the country *marking time* until some urban or city call releases them from what they conceive to be an environment. To meet this problem, the State and Church should encourage their best teachers and preachers to listen to the call of country life, where they can bestow their brightest and best efforts to bring the rural community to a higher standard of living. Hence the necessity to send broadly trained men into the open country to teach and preach; to build up an educational propaganda for a better country life which is the first requisite for an economically and socially sound and enduring civilization.

There is, however, a country-life movement. It has begun. The first concrete expression of it in the United States was the appointment of the Commission on Country Life by President Roosevelt in 1908. Early in 1909 this Commission made its report to the President. It found that agriculture was not commercially as profitable as it was entitled to considering the labor and energy expended by the farmer and the risks he assumed. They also found that the social conditions in the open country were far short of their possibilities. The Commission summarized its findings into three basic movements which are embraced within the great central country-life movement.

> 1. "An exhaustive study or survey of all the conditions that surround the business of farming and the people who live in the country, in order to take stock of our resources and to supply the farmer with local knowledge.
> 2. The organization of a 'nationalized extension work.'
> 3. The inauguration of a general campaign of rural progress.
>
> The country-life movement, therefore, is on. A brighter day for the farmer is coming when a new leadership will direct rural thought and a newer life will be the heritage of the people of the countryside."

In its closing utterances, the Commission referred to, sent forth an urgent appeal to service to bring about this Golden Era. And then paints a picture of what that day will be:

> "We must picture to ourselves a new rural social structure, developed from the strong resident forces of the open country; and then we must set at work all the agencies that will tend to bring this about. The entire people need to be roused to this avenue of usefulness. Most of the new leaders must be farmers who can find not only a satisfying business career on the farm, but who will throw themselves into the service of upbuilding the community. A new race of teachers is also to appear in the country. A new rural clergy is to be trained. These leaders will see the great underlying problem of country life, and together they will work, each in his own field, for the one goal of a new and permanent rural civilization. Upon the development of this distinctly rural civilization rests ultimately our ability, by methods of farming requiring the highest intelligence, to continue to feed and clothe the hungry nations; to supply the city and metropolis with fresh blood, clean bodies, and clear brains that can endure the strain of modern urban life; and to preserve a race of men in the open country that, in the future as in the past, will be the stay and strength of the nation in time of war and its guiding and controlling spirit in time of peace."

AGRICULTURAL PREPAREDNESS.

Probably there never was a time in the history of this country when it was so imperative and intensely important that the land be brought to a higher standard of cultivation in order to produce maximum yields of cereal products as at the present time. An appeal has gone forth from the Agricultural Department at Washington to the farmers of the country urging them to use every means in their power to increase the production of the land they cultivate.

To the farmers of Pennsylvania this call should come with peculiar force as it is a self-evident fact, as shown by the Statistician of the Department, that the yield of the staple cereals is not up to standard; but far below what European countries produce on land not relatively as rich as ours, and much longer tilled, being much older than America. None would suppose that old Scotland, with its rugged slopes could produce an average of 35 bushels of wheat, and in special instances 40 bushels have been grown. Yet Pennsylvania last year averaged little over 18 bushels per acre in wheat production. The same comparison is shown in other food products. Had Germany reached no higher standard of production than Pennsylvania, long before this, during the progress of this gigantic struggle for military mastery, she would have been long ago forced to yield for lack of foodstuffs denied her by importation. But it is owing to the wonderful productivity of her soils, brought about by a scientific application in cultivation, that Germany has been able to feed herself. When she can raise 222 bushels of potatoes to Pennsylvania's average for 1916 of 70 bushels, when she can grow 34 bushels of wheat against Pennsylvania's 18, 54 bushels of oats to our 31 and 29 bushels of rye to our 16; and all other food products in the same proportion, we need not be surprised at the wonderful fight she is making.

The slogan of the hour is "preparedness." It is discussed by Congress, preached from the pulpits and is printed in large letters in the press. Everyone recognizes, from a military point of view, the importance and necessity of being prepared either for or against war. But it is equally important as well as a necessity to be agriculturally prepared to meet the crises confronting our country by increasing the production of food products to feed the people and supply the army charged with the protection of our homes and national honor. Hence, a campaign of agricultural preparedness should be inaugurated to meet the grave issues of the hour.

To meet these issues, it is the policy of the Department in every way possible to arouse the grain and food producers of the State to more aggressive activity; to sow more grain, plant more potatoes, onions and cabbage, thereby increasing the supply to meet the enlarged demand. The Department is endeavoring to awaken in the tiller of the soil a keener realization of the need of exerting every effort to employ better methods of cultivation in order to increase the yield. We are trying to impress this upon the farmer not only as a good business proposition, from a selfish viewpoint, but to render a distinct service to humanity itself.

To secure the very best possible results in agriculture, co-operation is very necessary; mobilization of all lines relating to agriculture is urged in order that, as a State, we will do our full share in food production. Every acre of ground and all available labor should be utilized to its fullest capacity in producing such crops that will yield the greatest food values. In short, it is the aim of the Deparment to speed agriculture in Pennsylvania to the topnotch and we pledge all possible encouragement and assistance to the farmers in their efforts to increase food commodities.

The aim of the Department of Agriculture is to emphasize the importance of organizing, standardizing, systematizing and capitalizing the oldest and greatest of all industries, the fundamental occupation upon which the race is so absolutely dependent and without which no nation can exist. It is unnecessary to state that every other great industry is co-ordinated and established upon a more or less scientific basis. But the industry of farming, that produces the food which we must have to live, is still left largely to a private and personal initiative, and is conducted without any such co-operation as has alone made possible the tremendous industrial development which has taken place in almost every field of enterprise and labor. Everywhere else co-operation prevails. But farming, with the paramount problem of feeding the millions of our land, with its haphazard non-co-operative practice is, essentially, as a whole, no different from 100 years ago. The slogan of the hour is preparedness; but no less true is there need of co-operation.

SUMMARY OF BUREAU ACTIVITIES.

The Department of Agriculture, as at present constituted, is made up of the the following Bureaus, each actively engaged in carrying forward the work of this great Department with its diversified interests that reach every portion of the Commonwealth:

1. Bureau of Farmers' Institutes and Farm Advisers.
2. Bureau of Dairy and Food.
3. Bureau of Economic Zoology.
4. Bureau of Chemistry.
5. Bureau of Veterinary Science, embraced within the State Live-stock Sanitary Board.
6. Bureau of Statistics and Publicity.
7. Bureau of Disbursements.
8. Bureau of Publications.

From the first six of these divisions of the Department detailed reports are a part of this annual report and a perusal of same indicate that there has been, during the year, a marked advancement; those bureaus that are educational and State-wide in their operations have shown very satisfactory progress; the bureaus that are embraced within the area of police duties have been actively engaged in ferreting out the violators of law and thereby giving great service to the consumer in better food stuffs both for man and beast and purer seed to sow and better ingredients for the soil to increase the producing capacity of the seed.

It is the cherished hope that another bureau be added to the Department, if the measure to be brought before the General Assembly becomes a law, to be known as the Bureau of Markets. That there is need for such a division is apparent, and the hysteria of "high cost of living" that has swept the land during these later months, emphasizes the vast importance of a bureau, properly named, that will seek co-operation and bring together the producer and consumer and thus eliminate the middleman. It is a mistaken idea that the farmer and market gardener are to be blamed for the high cost of living. A perusal of the statistical reports of the State show the falsity of the charge; that farmers and producers of marketing products are getting but a fair per cent. over the cost of land, help and production.

BUREAU OF FARMERS' INSTITUTES AND ADVISERS.

The full report of the operations of this Bureau finds its place in its proper order in this Report. However, by way of a brief review of the work of this great educational feature of the Department, I am pleased to say that throughout the State a growing and wide-spread interest has been shown by the farmers in institute work. Special efforts have been made to assign practical men, mostly farmers, as instructors at institutes, and from many sections of the Commonwealth comes high praise for the lecturers the Department has furnished.

It is becoming more and more apparent that the great farming contingent of the State want men well versed in the several lines of agriculture, who, not only have studied the problems that confront the farmer, but have, in their own experience and practice, worked them out on their own land, thereby combining theory and practice in the instruction they impart. And there is a continued demand for men of that stamp and nothing else will satisfy the farming public.

It is the policy of the Department, with much correspondence, to ascertain the local conditions and needs before assigning instructors so that men specially qualified shall be furnished to discuss subjects that are germane to local needs. Hence, when an institute has been assigned to a distinctive dairy and cattle section, men versed in those lines are sent; and so of every other line of agricultural activity.

The Director, in his report, has called attention to a body of men, who have shown a most devoted sacrifice to the cause of institutes—the County Chairmen—who so generously devote much of their time to promote Farmers' Institutes. This service is given free of charge, their actual expenses being paid, and from four to twelve days time is given to the work of arranging places of institutes, printing programs and looking after the comfort of the instructors sent by the Department. These untiring men deserve much credit for their work.

FARM ADVISERS.

The advisory service of the Bureau of Farmers' Institutes, and under the direction of the Director, has made phenomenal progress during the year. I would call your Excellency's attention to the fact, that the experts in their various lines, ten in number, are employed in special advisory work less than eight months of the year, the remainder of the time being engaged in institute work. Yet, during the time stated, these instructors visited 9815 farms, giving instruction so far as within their power. Hundreds of letters come to the Department commendable of the work these officials have accomplished; and so numerous are the calls from all sections of the State for the services of these practical experts, that to meet the demand, there should be at least twenty men and women engaged in this educational feature of the Department.

The term "adviser" is appropriate. These experts visit the farms and give advice how to treat the soil, care for the stock and poultry, etc., which brings directly to the farmer the best ideas that can be advanced; not mere theory, but practical knowledge, offering the best solution to the numerous problems that confronts agriculture. Oral instruction is far more profitable than that which is written, and being on the ground, and studying the situation as they find it, these men are able to state facts that could not be given by correspondence or publications. In this respect I heartily commend this branch of our Department, and would suggest, so far as possible, that this feature of the Department's work be enlarged.

Besides personal visitations to the farms, these experts attended public meetings where they addressed groups of farmers on various subjects, there being nearly 300,000 people who attended these public gatherings to listen to the best thought on soils, fertilization, care of orchards, poultry raising, stock breeding, dairying, etc., etc. The services of these men were in great demand by county fair associations to judge farm products, poultry and livestock.

DAIRY AND FOOD BUREAU.

The operations of the Dairy and Food Bureau have been carried on in a very efficient manner, and the general aims and policies, as well as the general character of its work, are quite similar to those that have characterized the activities of the administration of its present Commissioner. The year 1916 witnessed a steady advance in popular sentiment favorable to the perfecting of pure food laws and the impartial enforcement thereof. Whereas not many years ago few thought seriously of the quality of the food products distributed through the retail grocers of the country, it is now the rule of the buyer to scrutinize the quality of the goods offered and to be somewhat careful in making his purchases. The literature on the subject has become so abundant and the consequences of food adulteration have been so vividly depicted by professional gentlemen that the area of popular intelligence has been greatly enlarged. The truth of this statement is not only verified by the rapid multiplication of laws throughout the Union concerning the manufacture and sale of articles going to make up the common food of the people, but also by the vast increase in books, magazine articles and editorial references to the subject. There has been no diminution of interest upon the part of the food journals, trade publications, the weekly and monthly magazines, or the daily press. On the contrary, if there has been any change it is in the direction of a more vital and a more intelligent concern for the enactment and enforcement of carefully framed provisions regulating the manufacture and sale of all articles of human consumption. There never was a period in the history of the United States when its people were more truly alive to the importance of the food problem. This interest is alert and eager and is confined to no particular section. It is wide-spread. It is equally manifest among the wage-earners, the wealthy and those who are moderately well-to-do. Anybody who takes up the study of food and the general attitude of the people of the United States toward its manufacture and sale, will have little difficulty in arriving at a fairly accurate estimate of the extent and power of this sentiment.

In the earlier days no urgent necessity for such oversight existed; changed conditions have had much to do with the creation of public uneasiness, followed by widespread agitation, and these brought forth fruit in the shape of the pioneer movements which have developed so satisfactorily in our time and which are destined to still more benefit the consuming public as the years go by. So long as there were no large manufacturing establishments, so long as our cities were small in extent and meager in population, so long as the average housewife put up her own household supply in the summer or autumn, each supplying the wants of her own family and possibly some of her nearby neighbors, there was little reason to complain and small fear that greed would work harm to the health of the consumer by the use of decayed or poisoned goods. The growth of population, the cultivation of the commercial spirit, the seizure of opportunities, the keenness of business rivalry, these are some of the things that led to the wholesale adulterations which robbed the consumer of his just due, while endangering his health and shortening his life. And this constant peril became so great at length that the agitation followed which has resulted in so decided an improvement in condition.

The report of the Commissioner is printed in full and is self-explanatory.

BUREAU OF ECONOMIC ZOOLOGY.

During the year a change was made in this Bureau by the resignation of Prof. H. A. Surface, August 15, and the appointment of Prof. J. G. Sanders as his successor.

The work of this Bureau has followed the usual line with other years, seeking control of insect pests and diseases of fruits and nurseries. During the decade there has been great advance in fruit growing, thousands of acres having been planted in apples and peaches. The climate, soil and situation of Pennsylvania combine to make it one of the most desirable states in the Union for fruit growing. No other state produces fruit of finer flavor or of more attractive appearance. While all the fruits can be grown anywhere in the State, still there are sections that are more especially adapted to this industry. The Department recognizing the importance of fruit growing, several years ago made an exhaustive investigation to discover the places of our State where each variety of fruit had shown the best results. Following up this investigation, there has been great improvement in fruit growing.

Plans are being outlined by the new chief of the Bureau that promise excellent results, not only in eradicating the enemies of fruit growing, but in establishing a course of education that will be helpful to the people of the State in further advance in this important industry.

The Apiary industry is under the supervision of the Bureau of Economic Zoology and enlarged plans are being formulated to make bee keeping a most helpful and remunerative industry to the State. Reports from the State show that the yield of honey has been 28 per cent. greater in 1916 than in 1915. Formerly the eating of honey was regarded as a luxury; today, in this era of high prices, it is a valuable article of food, and cheaper than many of the food products. From a recent investigation, it is shown that honey has a greater food value in units of energy than many of the staple articles used in our households. That it has more nourishment, more fuel and more heat units than meat, fish or eggs, and decidedly cheaper as a food than either of these articles. That seven ounces of honey, worth about nine cents equals 10 eggs, 12 ounces of beefsteak, 15 ounces of codfish, 8 oranges or 5 bananas.

BUREAU OF CHEMISTRY.

The Chief Chemist has submitted a carefully drawn report of the work that comes under his supervision. This division of the Department is strictly analytical, and requires the best type of men to carry on its operations. There is committed to the Bureau the duty of enforcing the laws regulating the sale of feeding stuffs, fertilizers, linseed oil, seeds, paints, putty, turpentine and lime. A total of 3,044 samples of these commodities were received during 1916, and same were analyzed and determinations made.

In securing samples of feeding stuffs, the special agents visited 310 towns and cities in the State, in 65 counties, and secured 1,148 samples. All of these samples were analyzed for moisture, protein, fat and fiber and examined microscopically to determine whether or not the ingredients claimed were present, and for the purpose of detecting any evidence of the addition or use of adulterants or prohibited products. With the exception of cottonseed meals, the general character of the feeds sold was good. It is certainly a commendable feature, that the great State of Pennsylvania stands between the dealer and consumer and sees that the feeds our livestock consume are up to standard. The prosecutions ordered during the year were 40, the fines and costs accruing therefrom being $878.92, which amount was turned over to the State Treasury. Besides the samples of feeding stuffs gathered by the agents and analyzed, there were special samples sent in by the residents of the State to the number of 263, the fees for which amounted to $263.00, and the same was paid into the State Treasury. The registrations for feeding stuffs during the year covered 2,318 kinds and brands.

As noted by the Chief Chemist, the analytical work of fertilizers which formerly was made at the State Experimental Station, was done in the Department laboratory connected with this Bureau. There were 896 samples received from the official sampling agents, of which number 684 samples were analyzed. There were 414 distinct brands of fertilizers, the output of 79 companies.

In carrying out the law regulating the sale of Linseed Oil, 41 samples were received and analyzed.

One of the most popular measures given the Bureau for enforcement is the Agricultural Seed Law, and which is of great service to the users of seeds in the State. There were gathered by our agents, 323 samples, all of which were carefully tested for purity by our Seed Analyst. In accordance with a provision of the Seed Law, special samples for the fee of 25 cents each were received and examined. From this source of revenue, the receipts amounted to $43.25, and same was paid over to the State Treasurer.

The enforcement of the law regulating the sale of paint, putty and turpentine, was carried out as far as possible, there having been interference with the analytical work of these commodities by other lines of work. It was early learned by the chemists working on the samples obtained, that the passage of the law was timely, there being from the samples gathered and examined, 50 per cent of which were adulterated.

In carrying out the provisions of the law regulating the sale of lime products, which became effective the first of the year 1916, 163 samples were received from the authorized agents of the Department and 41 samples received in accordance with the special provision.

THE STATE LIVESTOCK SANITARY BOARD.

The State Veterinarian, as Secretary, has supervision over this Bureau of the Department, a full and detailed report of which comes in its proper order in this report. A very brief reference need only be made here.

A very beneficial service rendered the meat consuming public is the inspection of slaughter houses and the examination of meats. While fifty per cent. of the meat consumed in Pennsylvania is slaughtered under Federal or Municipal inspection, leaving the other half to the State Livestock Sanitary Board, it must be apparent to anyone that the force maintained by the Bureau is inadequate to supervise the slaughtering of animals of that other half. The report of the officer having charge of the Meat Hygiene work shows that 52 establishments were closed, while at large there has been a marked improvement in the meat supply of the State during the year just ended.

The following resume of the work of the Meat Hygiene service indicates that the agents of the Board were active:

Number of meat markets examined,	9,997
Number of slaughter houses examined,	3,327
Number of carcasses examined,	43,837
Number of organs examined,	46,446
Number of pounds of meat inspected and passed,	2,717,783

The Secretary of the Board calls attention to the importance of increased interest in horse breeding and urges a more concerted and individual co-operation in this branch of agricultural activity. The European War has depleted the country of horses, hence to meet the further demand upon the part of our Allies in the prosecution of the world's great struggle for democracy and to supply our own market there should be a forward movement in increasing horsebreeding in our State. The farm tractor, it is true, has come; but it is doubtful whether it will ever be as useful and economical as the horse upon the farm. The statistical table accompanying the report on horsebreeding is very valuable and suggestive.

In combatting the various transmissible diseases attacking the livestock of the State, vigorous and heroic measures have been taken by the Bureau. These are discussed at length by the veterinarian and should be carefully studied, especial attention being called to aborting cattle and the treatment submitted.

The increase of hog cholera is to be deplored, when there is a revival in swine husbandry. The increase of this dread disease, according to the report, is due principally to infection spread from public sales, 80 per cent. of the cases found by the agents of the Bureau being traced to this one cause. Farmers are advised against purchasing hogs at public sales.

There was quite a decrease of rabies in the State during 1916, there being 159 cases reported as against 327 in 1915.

BUREAU OF STATISTICS.

The title given to this Bureau as the word statistics is generally understood and applied conveys a wrong impression. The name suggests figures which are usually tiresome, stale and uninteresting. As a rule we shrink from reading such; yet frequently these statistics are of an educational and suggestive character and frought with important value. The work of the Bureau is largely of a publicity character, through which there goes forth to the State facts that are more convincing than argument.

The reports gathered by this Bureau are of value to both the consumers and the commission men of the State as it provides a system of ascertaining in what sections of the State the crops are the largest and where stock can be secured. In this manner it has been of big advantage on a number of occasions in helping to move surplus stocks of farm crops.

The Bureau, therefore, is both of a statistical and publicity nature; and since its inauguration as a separate division of the Department, it has aroused a great interest in every line of agricultural work. Formerly the compilation known as the "Crop and Livestock Report" was an annual production and of little intrinsic value to the State. With the present construction of the Bureau, nearly a regiment of responsible farmers, livestock dealers and fruit growers-representing about eight hundred townships—are our correspondents. These correspondents or reporters make reports monthly on the condition of crops, amounts produced, prices, etc.; as well as information relating to fruit, livestock and miscellaneous data along agricultural lines which are very useful for comparison as the months come and go. These monthly reports are given herewith as a part of this Annual Report with comments of the Statistician accompanying same.

The annual review for the year of 1916 tells the story of Pennsylvania farming and allied interests. It is true that the statements are approximated, but the reports gathered through our correspondents are conservative and as nearly correct as can possibly be obtained.

Wheat: Estimated area harvested was 1,333,540 acres and the production of 25,070,500 bushels. At an average price of $1.46 per bushel, netted the farmers of the State $36,602,930.00. With an increased production over 1915 of 142,500 bushels and an increased price of forty-one cents per bushel, the total increased valuation of this staple cereal amounted to $10,428,530.00.

Corn: The estimated yield of 54,061,400 bushels of corn from 1,461,120 acres, brought to the farmers an income of $49,736,488.00. The loss in bushels over the previous year was slight while the average price per bushel increased from seventy-six cents to ninety-two cents. This substantial increase in price netted the farmers $8,094,568.00 more for their labors than the year 1915.

Rye: There were sown for the 1916 harvest 266,000 acres of rye, which produced approximately 4,495,400 bushels and was valued at $4,675,216.00. This was an increase in value over 1915 of $704,016.00.

Oats: There was a decided slump in the oat crop over the year previous. The total acreage was 1,050,680 which was 43,780 acres less than in 1915. The production was 32,571,000 bushels which was 10,524,000 bushels less than in 1915 The net decline in value over the year previous was $1,909,650.00.

Buckwheat: In buckwheat, Pennsylvania stands first in the Union; but the year closing December 31, 1916, showed a decrease in the number of bushels raised over the year previous. The increased price over the year 1915 fixed the value of the crop at $338,000.00 more than the year previous. It is worthy of remark that the average price per bushel increased from seventy-eight cents in 1915 to $1.04 in 1916.

The season of 1916, from the standpoint of production of all farm products and prices received, has been a prosperous one. In 1915, the valuation of the five staple cereals, wheat, corn, rye, oats and buckwheat was estimated at $148,183,420.00; while, in 1916, the same grains were valued at $184,927,099.90.

The bumper crop of the year was hay. There were approximately 5,241,270 tons harvested which was 1,683,270 tons more than the year previous. The value was fixed at $75,998,415.00 which was $19,426,215.00 in excess of the year 1915.

An added feature of the Bureau is the appointment of a Director of Publications whose chief duty is to distribute information throughout the State by the publication of a Weekly Press Bulletin—a publication replete with news and information that affect the farmer, dealer in livestock, the fruit grower, the poultryman and the housewife. This News Letter touches on every line of agriculture and the advice furnished through the farm advisers and others is fresh, refers only to Pennsylvania conditions, and meets the wants of not only the farmer but the general public in every line of agricultural activity.

These Weekly Press Bulletins are sent to the daily and weekly newspapers of the State and have resulted in the establishment of many agricultural pages, run once a week in many of the largest dailies and weeklies of the Commonwealth. Practically every newspaper in the State publishes portions of this News Letter and many publish the entire three column contents weekly, thereby bringing to the attention of the entire population of the State timely agricultural hints and suggestions.

In addition to this work, the publication department takes care of furnishing the newspapers, and through them the people of the Commonwealth, with the work of every Bureau of the Department of Agriculture. Heretofore reports that contained valuable information to the public were printed only in bulletin form, but now briefs are made of the essential features and the newspapers are furnished with this material. The advance press notices furnished through this channel has led to a large increased interest and attendance at the Farmers Institutes during the past season and the farmers and general public of the State has been awakened to the facilities for agricultural help which the State through the Department of Agriculture extends to them.

It is estimated that the newspapers of the Commonwealth during 1916 printed 32,417 columns or 4,631 newspaper pages of news articles concerning the Department of Agriculture. Never before in the history of the Department is it so much in the lime-light as now, and it is doubtful if any other source of information has been as valuable to the people of the State as the help furnished along agricultural lines and matters affecting the food regulations of our Commonwealth.

PUBLICATIONS.

The regular publication of bulletins from time to time has been kept up during the year. In addition to the monthly bulletins issued by the Dairy and Food Bureau and Bureau of Economic Zoology, the Department issued the following:

No. 271.	Creameries of Pennsylvania.
No. 272.	Tomato Catsups.
No. 273.	Pennsylvania Farms for Sale.
No. 274.	Linseed Oil Report.
No. 275.	List of Fertilizer and Lime Dealers.
No. 276.	Seed Report.
No. 277.	Analyses of Fertilizers.
No. 278.	Proceedings State Board of Agriculture.
No. 279.	Preliminary Report of the Dairy and Food Bureau.
No. 280.	Report of Feeding Stuffs.
No. 281.	List of Local and County Fairs.
No. 282.	Analyses of Commercial Fertilizers.
No. 283.	Proceedings of Normal Institute.
No. 284.	Schedule of Farmers' Institutes.
No. 285.	Flavoring Extracts.

Never since the Department was established in 1895 has there been such a demand for agricultural literature as during the year just closed. The high standard of the Pennsylvania Department bulletins has brought unusual demands for same, not only in the State, but from other states of the Union; in fact from other countries come frequent requests for our literature; from China, Japan, Australia, Africa and South America.

To meet this increased demand larger number of bulletins have been printed and mailed. Our bulletin rooms are visited daily by visitors seeking information on all lines of agriculture. The lack of appropriation has curtailed the preparation of bulletins on new subjects, for which there are numerous calls. It is with great regret that we are unable to meet the demand and must inform those who seek information, that the Department does not publish same.

CONCLUSION.

I have referred briefly to the activities of the Department through its several Bureaus. However, the Department has given attention to other lines of activity and promises the year to come greater things in carrying these special features to a higher development. The activities specially emphasized are as follows:

INCREASE IN SHEEP

For the first time in ten years the sheep statistics show an increase in the State, followinug a campaign conducted by the Department to increase interest in the sheep industry. For ten years there has been a three per cent yearly decrease, but during the past year this annual decrease of approximately 25,000 sheep was overcome and in addition there was an actual increase of between five and six thousand sheep.

BUREAU OF MARKETS

In anticipation of an effort to have legislation established creating a Bureau of Markets in the Department, members of the staff of Farm Advisers have been doing marketing work for the farmers and thousands of bushels of potatoes, tons of hay, wheat, and many other farm commodities were sold. The establishment of this Bureau promises to be one of the most progressive steps made in agriculture in years.

AGRICULTURAL TOURS

The Department had charge of the three successful Agricultural Tours in the Fall, when northern, eastern and southern sections of the State were covered on three automobile trips with parties of from 100 to 150 persons on each trip. Many stops were made at principal points in each county, noonday meals were taken with farmers in groves and parks and the spirit of visiting the rural residents of the State and outlining to them what the State Government was trying to do in their behalf has had the effect of cementing many friendships and extending the co-operative aid of the numerous departments to many citizens of our State.

ENCOURAGING DAIRYING

There has been a decrease in the interest in dairying and a decrease in dairy cows in many centers of the State, due to the high price of feed and the lack of corresponding increase in price paid to the producers. The Department has been working out systematic costs accounts with the producers and organizing dairymen into associations which aim to secure better conditions to promote the industry and encourage an increase in dairying and beef feeding.

RURAL WOMAN'S WORK

The Department has been assisting in the organization of women's clubs for the purpose of securing better country and town improvements, Red Cross work and canning food preservation campaigns.

NEW LAWS ADVOCATED

The Department has prepared for the consideration of the Legislature new laws regulating the keeping of dogs, improved nursery inspection and licensing, fertilizer registration adjustment, noxious weed destruction, apple grading and packing, pure spraying chemicals, and agricultural assessment.

ZOOLOGY WORK

Several campaigns have been planned by the Bureau of Zoology which include: Study of Angumois grain moth; encouragement of bee industry; white pine blister rust extermination; potato growing demonstrations, and general educational campaign against diseases and insect pests of garden and farm crops.

STATISTICS AND INFORMATION

Supplementing what I have had to say in another place, the Bureau of Statistics has been enlarged and a wider scope has been given the monthly crop reports gathered from all townships of the State. This Bureau has added new features and has handled the reports of the work of the different bureaus of the Department. The Bureau has proved a valuable asset in co-operating with the United States Department of Agriculture in recording the crop production of the State and in imparting to the farmers and the public valuable information concerning crops and agricultural conditions in the State.

STATE CORN, FRUIT, DAIRY PRODUCTS, VEGETABLE AND WOOL SHOW

During the annual meeting of the State Board of Agriculture and other State agricultural and livestock organizations in Harrisburg in January, a farm products show was held, at which there were numerous displays of corn, wool, apples, pears, vegetables, butter and milk. It was the first winter show ever held in the State where agricultural implements were displayed. The commercial display included various classes and types of tractors, improved machinery of all kinds, feeds, spraying materials and grading machines.

The Department had the valuable co-operation of the Vocational Division of the Department of Public Instruction, Farm Bureaus, Pennsylvania Breeders' and Dairymen's Association, State Horticultural Association of Pennsylvania, Pennsylvania Vegetable Growers' Association, Pennsylvania Sheep Breeders' and Wool Growers' Association, Pennsylvania State Veterinary Medical Association, and commercial exhibitors who were the means of making the show a success. It is estimated that ten thousand people attended the exhibition in three days, farmers from all sections of the State registering. One of the features was the presence of boys and girls from the Vocational Schools of the State. Valuable prizes were awarded for all classes of exhibits and the show was undoubtedly the best ever held in the Commonwealth.

FINAL WORDS

I wish to acknowledge my very high appreciation of the untiring devotion to duty manifested during the year by all the Bureau heads, as well as the entire clerical force of the Department. The Department has no "dead timber." Everybody connected with it has enough to do and does it well and willingly.

I desire also to acknowledge the debt of gratitude I owe to your Excellency, for the substantial aid you have given the Department and the readiness with which you have embraced every opportunity for strengthening the hands of the Secretary and increasing the helpfulness of the Department to the agriculture of the State. The agricultural tours, referred to above, would not have resulted in the great success they brought had it not been for the inspiring presence and enthusiastic addresses of your Excellency.

The thanks of the Department are due also to the public press of the State for the willingness with which space was given for the free publication of communications and the Weekly Press Bulletins that have gone out from the Department for the information of the people. Hundreds of thousands of readers of the daily and weekly publications look anxiously for what the Department has to say on the great subject of agriculture and its allied activities.

Very truly yours,

CHARLES E. PATTON,
Secretary of Agriculture.

TWENTY-SECOND ANNUAL REPORT OF THE BUREAU OF FARMERS' INSTITUTES FOR SEASON OF 1915-1916

Harrisburg, Pa., January 1, 1917.

To the Hon. Charles E. Patton, Secretary of Agriculture:

Sir: I have the honor to present herewith the Twenty-second Annual Report of the Bureau of Farmers' Institutes.

INSTITUTES AND MOVABLE SCHOOLS

There were held the season ending June 1, 1916, in the different counties, 412 days of Institutes and Schools, divided into 999 sessions, the total attendance at which was 155,969. Comparing this attendance with the previous year you will find somewhat of a decrease in the number of days and attendance, which was caused by the shortage of funds. The Governor, in order to keep the different appropriations within the funds available, was compelled to reduce our appropriation, among others, from $22,500.00 to $20,000.00, which, of necessity, required that we reduce the salaries of the instructors 10%, and proportionately reduce the number of Institutes held.

The work, as carried on throughout the State, was that of imparting information to farmers through the agency of Farmers' Institutes. I think you will agree with me when I say that this line of agricultural education is one of great importance to the farmers. In looking at this matter from a business standpoint, you can readily see why our method of supplying instructors at the different meetings should be well received. With all due respect to the different agencies teaching agricultural education, we take some pride in our method of procuring Institute speakers, which is as follows: We have our section leaders report to this office the efficiency of all local help having a place on the program, and if the Bureau feels there is a call for their special line, we then correspond with him or her with the final purpose of assigning to a week's work the coming Institute season, when, if we find their messages are well received and of value to farmers, more continuous work is added to the assignments the following season. Thus you will see, through this system, we are bound to surround ourselves with the most up-to-date successful farmers in this or any other state.

Too much credit cannot be given our County Chairmen, who so generously devote days of their time to promote and look after the Farmers' Institutes. This service is given free of charge, they only receiving their actual expenses up to $12.50 per day, which embraces hall rent, printing programs, conveying speakers to and from railroad station, and their local hotel and traveling expenses. It is through their untiring efforts that the Institutes have been so well received in the local communities and have attained their foremost place as an educational feature along agricultural lines.

We wish to thank the State College for its part in making the Institutes a success, which so generously furnished the Department with

13 instructors, rendering 78 days of service. The only charge connected with this service is, that we pay their hotel and traveling expenses.

This report would be incomplete without acknowledging the valuable service rendered the Institute work by the press of the State, both secular and agricultural, in publishing the dates and places where Institutes are held, giving list of speakers, and, in fact, most of the papers have published the proceedings of the Institutes in full, thereby presenting to the farmers who were unable to attend the meetings, the teachings of the Institute. There were engaged in the work 54 lecturers, taking up all lines of farm operation as carried on within the State, embracing animal industry, horticulture, the poultry industry, dairying in all its branches, soil fertility, marketing farm products and home sanitation and household economics.

FARM ADVISERS

It gives me pleasure to say that the advisory service in this Bureau has been a great success, reaching as it does thousands of farmers throughout the State and helping them with their individual problems, which is undoubtedly one of the factors responsible for better farming in Pennsylvania. During the season from June 1, 1915 to May 31, 1916, the farm advisers visited 9,815 farms, giving such assistance as was within their power. The commendable letters received from the different applicants over the State go to show that this particular line of conveying information directly to the farmers by experts who have successfully carried out their methods is meeting with general approval.

Mr. J. T. Campbell, farm adviser on Soils, Farm Crops and Poultry, visited an average of four farms per week, looking over the farms and counselling with the farmers as to the best solution for their problems. During the same time he attended one to three public meetings per week, addressing groups of farmers on soil improvement and poultry production. Frequently an open meeting was held in a central place where he spoke on soil improvement; following up by spending one to three days visiting farmers where he had calls to come and look over conditions. Field meetings were held where a small group of interested farmers could get together and with them he would go over the land pointing out conditions and suggesting means of improvement. These meetings usually created much interest and discussion. Considerable time was occupied in assisting poultrymen attending meetings of Poultry Associations, laying out the work and advising in model buildings, later, following this up by giving them additional directions leading to a successful outcome.

The work of Mr. E. B. Dorsett, farm adviser on Co-operation in Farming, was largely an educational campaign. More than 500 meetings were addressed, having an average attendance of 200 at each meeting or a total of 200,000 for the year. They consisted of Grange meetings and picnics, Harvest Home picnics, Special Institutes and other farm meetings. At these meetings the necessity for farm organization and co-operation and the benefits derived therefrom were freely discussed. The best means of keeping in touch with market needs and conditions were given careful thought and consideration, farm organizations were effected and the members interested in modern methods of grading, sorting, packing and shipping. Markets were obtained for the various farm products, such as straw, grain, fruit and vegetables, all of which was satisfactory and greatly appreciated. Many obstacles were encountered, such as lack of organization, system, confidence in themselves and the distributor, inadequate shipping facilities, little knowledge of market needs and conditions, poor grading and bad packages. Many cars of peaches were shipped direct from the orchard to the consumer living in counties where peaches are not grown. With but one exception this method of marketing proved highly satisfactory. But little effort was made to market small packages of any farm product, his effort being directed almost wholly to the marketing by carloads. The work accomplished thus far has demonstrated beyond all doubt that the plan is not only feasible, but that it is very practical and meets with the general approval of the farmer, consumer and distributor, and should be improved and extended so that it will include the marketing and distribution of all farm products in an economical and intelligent manner.

The work of Mrs. Jean Kane Foulke, farm adviser on Sanitation and Home Economics, consisted of writing over 2,000 letters, giving advice along all phases of woman's work. She wrote over 20 articles for publication, made 145 public addresses, speaking before Granges, Farmers' Unions and Clubs, Teachers' Institutes, Farmers' Institutes and picnics and to Women's Clubs, Mothers' Councils, etc. Also visited many rural schools as she travelled over the State, calling at over fifty homes on special request to give advice on home problems and improving kitchens, household arrangements and general living conditions, giving demonstrations with models of sanitary plumbing and sewage systems for rural homes, home-made fireless cookers and domestic science cabinets, organized ten or more Home-School Associations or Community Centers in rural schools with the object of benefitting the schools and the communities near them. She has succeeded in awakening mutual interest between the urban and rural women that has been helpful, and many of the Women's Clubs in small towns are taking in out-of-town members and establishing co-operative interests of both social and business character with women living in the country. This movement is of great benefit to all concerned and is developing Rest Rooms in towns, Market Exchanges where produce, canned goods, sewing, etc., can be bought and sold, and on many other lines helpful to both classes of women.

Mr. Sheldon W. Funk, farm adviser on Market Gardening and Fruits, advised with 375 men and women in 35 counties of the State, also judged ten Agricultural Fairs and held 22 meetings with an attendance of 18,020. The majority of the work was along the line of orcharding where he advised on the buying of land best suited for growing of fruit, the selection of varieties best adapted to the soil and the climatic conditions, the planting, pruning and spraying of the trees together with all other orchard practices. Much of his orchard work has been on pruning and has no doubt done much good in this line. In many cases he has been able to visit the same men two or three times a year and in that way assist them to work out a system of pruning best adapted to their home conditions.

As a concrete example, we might mention the following men: W. E. Schmick, Hamburg; Wm. F. Sterling, Mifflinburg; George R. Elder, Easton, and Charles N. Cressman, Quakertown, Pa., where he has gotten splendid results. In addition to the orchard work, he had a great many calls on market gardening where he advised on soil and crop improvement together with the control of numerous garden insects and diseases, also worked along the line of greenhouse construction and landscape gardening.

Mr. L. W. Lighty, farm adviser on Soils, Farm Crops, Dairying and Animal Husbandry, visited 289 farms where he advised with the farmers along the lines of soil testing for lime and organic matter, remodeling dairy barns, also planned dairy barns and equipment. He attended 67 special meetings with a total attendance of 18,870 people. He has been kept extremely busy answering correspondence in relation to dairy problems, having answered over a thousand letters requesting information on dairy and soil problems.

Prof. Franklin Menges, farm adviser on Soils and Farm Crops, visited over 400 farms, in most cases examining to determine the acidity and in many instances the humus in the soil, and in the presence of more than twice as many farmers during the same period. He addressed 44 farmers' meetings with an aggregate attendance of 22,000 people. One meeting at Hanover was attended by over 10,000 people, while another at Black Barren Springs had an attendance of more than 5,000. He was assigned to 10 Agricultural Fairs and gave daily soil demonstrations, answering over 900 letters requesting information relative to soil and crop conditions.

Mr. Charles G. McLain, farm adviser on Drainage and Water Supply, has visited 298 farms laying out for them a drainage system, which in most instances the work has been started, and while some of the others will proceed just as soon as it is possible for the owner to get the necessary help, in many of the farms the work was started in the early days of the advisory work and it is being continued from year to year. The number of homes that are installing water systems is increasing rapidly. Every kind of a system manufactured is being used, depending on the condition and amount of water to be had. His work in helping to establish drainage systems and farm house water systems has called him to almost every county in the State during the last year. In many cases the farmers are not financially able to undertake the whole proposition of drainage in one season, and in other cases the labor problem has been such that a sufficient number of men could not be had for the completing of the work. The calls for help in this line are coming in very rapidly and are attended to as speedily as possible. The work the past year embraced all kinds of land from river bottom land and land almost on the top of the mountains, as there is soil that needs the under drainage in all sections of the State.

Mr. W. Theo. Wittman, farm adviser on Poultry, advised with 376 farmers in 46 counties of the State. He also judged 14 Agricultural Fairs and held 19 meetings, with an attendance of 22,600. His work was more generally appreciated and used this year than ever before. This was true of both men and women, farmers and others who have taken up poultry and egg farming as a means of livelihood. He has found it quite difficult to do much educational work along the above line because he has been kept more than busy filling requests for calls that come to him. While all the advisers have a large amount of correspondence, probably no other one has had the tremendous amount as involves this special line of poultry teaching, having many requests as to diseases, remedies, sanitation, construction of poultry houses, etc. This, in addition to his field work, kept him extremely busy.

ATTENDANCE AT PENNSYLVANIA FARMERS' INSTITUTES
1915-1916

The following is a complete list, by counties, of dates and places where Institutes were held throughout the State for the Institute year ending June 1, 1916:

PENNSYLVANIA FARMERS' INSTITUTES—SEASON OF 1915-1916.

County	Place	Date	Days of institute	Number of sessions	Attendance by Sessions	Speakers Present		Attendance		
						Local	State	Average	Total	By counties
Adams, ...	Arendtsville, ...	Dec. 13-14, ...	2	5	35, 125, 65, 80, 100	....	4	81	406	
	Fairfield, ...	Dec. 15-16, ...	2	5	45, 85, 55, 150, 200	....	4	108	536	
	New Oxford, ...	Dec. 17-18, ...	2	5	40, 100, 35, 60, 125	....	4	72	360	1,300
Allegheny, ...	Millerstown, ...	Nov. 29-30, ...	2	5	75, 275, 50, 200, 325	1	3	185	925	
	Perrysville, ...	Dec. 1-2, ...	2	6	35, 50, 100, 25, 85, 125	2	4	85	420	
	Mt. Union, ...	Dec. 3-4, ...	2	5	50, 250, 125, 200, 275	2	3	180	900	2,245
Armstrong, ...	Spring Church, ...	Jan. 31-Feb. 1, ...	2	5	75, 100, 100, 125, 250	....	3	130	150	
	Brick Church, ...	Feb. 2-3, ...	2	5	85, 125, 100, 125, 175	....	3	122	610	
	Cowansville, ...	Feb. 4-5, ...	2	5	40, 100, 35, 50, 150	....	3	75	375	1,635
Beaver, ...	Hanover, ...	Nov. 22-23, ...	2	5	35, 250, 30, 75, 100	2	3	98	490	
	Ohio Valley, Grange Hall,	Nov. 26-27, ...	2	5	35, 50, 40, 75, 150	2	3	70	350	
	Chippewa, Grange Hall, ..	Nov. 26-27, ...	2	5	40, 100, 30, 75, 150	4	3	80	400	1,240
Bedford, ...	Loysburg, ...	Jan. 12-13, ...	2	6	75, 130, 44, 84, 138	1	3	94	471	
	Cessna, ...	Jan. 14-15, ...	2	5	37, 47, 22, 55, 115	1	4	55	276	
	Mench, ...	Jan. 17, ...	1	2	100, 181	....	2	140	281	1,028
Berks, ...	Bally, ...	Feb. 21-22, ...	2	5	110, 300, 50, 150, 400	....	4	202	1,010	
	Mt. Etna, ...	Feb. 23-24, ...	2	5	100, 225, 50, 100, 150	....	4	125	625	
	Temple, ...	Feb. 25-26, ...	2	5	100, 200, 50, 125, 250	....	4	145	725	
	Jacksonwald, ...	Feb. 28-29, ...	2	5	75, 200, 100, 150, 350	1	4	175	875	
(Special), ...	Geigers Mills, ...	March 17-18, ...	2	5	75, 125, 50, 100, 175	5	2	105	525	3,760
Blair, ...	Geeseytown, ...	Feb. 1-2, ...	2	5	56, 325, 53, 115, 325	2	3	175	874	
	Duncansville, ...	Feb. 3, ...	1	2	35, 75	....	2	55	110	
	Bellwood, ...	Feb. 4-5, ...	2	4	54, 95, 90, 250	1	3	98	489	1,473
Bradford, ...	Wilmot, ...	Dec. 15-16, ...	2	5	75, 196, 67, 112, 247	....	3	139	697	
	Stevensville, ...	Dec. 17-18, ...	2	4	64, 162, 38, 165	....	4	107	429	
	Limehill, ...	Dec. 20-21, ...	2	4	76, 240, 150, 200	....	4	166	666	
	Rome, ...	Dec. 22-23, ...	2	5	96, 218, 39, 187, 260	....	4	160	800	2,592
Bucks, ...	Springtown, ...	Jan. 31-Feb. 1, ...	2	5	74, 215, 65, 172, 275	....	3	160	801	
	Sellersville, ...	Feb. 2-3, ...	2	5	77, 200, 85, 200, 325	2	3	187	937	
	Bristol, ...	Feb. 4, ...	1	3	44, 84, 160	2	3	96	288	
	New Hope, ...	Feb. 4-5, ...	2	5	55, 110, 36, 130, 245	3	3	115	576	
	Newtown, ...	Feb. 7-8, ...	2	5	156, 225, 76, 255, 350	1	3	212	1,062	
(Special), ...	Plumsteadville, ...	Feb. 24, ...	1	2	145, 165	1	2	150	300	3,964
Butler, ...	Prospect, ...	Jan. 17-18, ...	2	5	50, 300, 50, 100, 400	2	3	180	900	
	Bruin, ...	Jan. 19-20, ...	2	5	50, 125, 40, 75, 150	2	3	88	440	
	Evans City, ...	Jan. 21-22, ...	2	5	75, 350, 75, 150, 400	3	3	210	1,050	2,390

PENNSYLVANIA FARMERS' INSTITUTES—SEASON OF 1915-16—Continued.

County	Place	Date	Days of Institute	Number of sessions	Attendance by Sessions	Speakers Present		Attendance		
						Local	State	Average	Total	By counties
Cambria,	Pleasant Hill,	Jan. 3-4,	2	5	35, 110, 50, 150, 160	....	3	101	505	
(Movable Institute School),	Salix,	Jan. 10-11,	2	5	150, 140, 140, 175, 100	....	2	141	705	
(Movable Institute School),	Salix,	Jan. 12-13,	2	5	125, 165, 150, 175, 135	....	2	150	750	1,960
Cameron,	Emporium,	Feb. 21,	2	5	34, 46, 28, 56, 64	....	3	46	228	228
Carbon,	Big Creek,	Nov. 24-25,	2	5	45, 210, 52, 110, 250	....	4	153	765	
	New Mahoning,	Nov. 26-27,	2	5	32, 245, 142, 195, 285	....	4	180	899	
	Weatherly,	Nov. 29-30,	2	5	25, 75, 23, 142, 127	....	4	58	292	1,936
Centre,	Millheim,	Dec. 13-14,	2	5	135, 375, 60, 150, 330	....	3	210	1,050	
	Pinegrove Mills,	Dec. 15-16,	2	5	18, 115, 20, 43, 230	....	3	85	426	
	Pleasant Gap,	Dec. 17-18,	2	5	20, 56, 24, 27, 104	....	3	46	231	1,707
Chester,	Cedarville,	March 1-2,	2	5	250, 350, 225, 350, 350	....	5	305	1,525	
	Byers,	March 3-4,	2	5	153, 200, 190, 210, 260	....	5	203	1,013	
	Parkesburg,	March 6-7,	2	4	60, 200, 125, 250	....	5	159	635	
	Doe Run,	March 8-9,	2	4	100, 225, 100, 250	2	5	169	675	
(Special),	Westgrove,	Jan. 28-29,	2	4	300, 400, 250, 400	3	1	340	1,350	5,198
Clarion,	Clarion,	Feb. 7-8,	2	5	75, 175, 70, 125, 200	2	4	129	645	
	Miola,	Feb. 9,	1	3	80, 100, 200	....	4	127	380	
	Frogtown,	Feb. 10,	1	3	25, 125, 225	....	4	125	375	
	Sligo,	Feb. 11-12,	2	5	100, 350, 75, 250, 400	....	4	235	1,175	2,575
Clearfield,	Kylertown,	Dec. 20-21,	2	5	33, 82, 30, 55, 204	....	3	81	404	
	Penfield,	Dec. 22-23,	2	4	22, 57, 35, 38	....	2	38	152	
	Lawrence,	Feb. 29,	1	3	48, 135, 155	4	2	113	338	
	Rockton,	March 1-2,	2	5	48, 175, 42, 163, 210	4	2	127	635	
	Curwensville,	March 3-4,	2	6	17, 85, 145, 28, 90, 75	5	2	72	430	
	Kerrmoor,	March 6-7,	2	5	28, 90, 60, 250, 275	6	2	139	693	
	East Ridge,	March 8-9,	2	6	120, 150, 220, 115, 205, 225	5	2	173	1,035	3,687
Clinton,	Woolrich,	Feb. 23-24,	2	5	34, 216 28, ,212, 302	....	3	158	792	
	Mackeyville,	Feb. 25-26,	2	5	74, 128, 98, 132, 256	....	4	137	686	
(Movable Institute School),	Loganton,	Feb. 28,	1	2	98, 412	....	4	255	510	1,980
Columbia,	Jerseytown,	Feb. 4-5-6,	3	8	89, 250, 75, 85, 250, 80, 315, 400	....	3	192	1,535	....
(Movable Institute School),	Numidia,	Feb. 6-7-8,	3	8	50, 125, 360, 70, 150, 325, 140, 175	....	3	177	1,425	2,960

Crawford,	Cochranton,	Feb. 18-19,	2	5	200, 300, 150, 350, 500	2	4	300	1,500	
	Conneaut Lake,	Feb. 21-22,	2	5	50, 75, 50, 75, 150	1	4	80	400	
	Dicksonburg,	Feb. 23-24,	2	5	75, 175, 125, 200, 225	2	4	160	800	
	Townville,	Feb. 25-26,	2	5	125, 225, 210, 325, 200	2	4	217	1,085	2,785
Cumberland,	Newburg,	Jan. 17-18,	2	5	75, 215, 75, 200, 250	....	3	163	815	
	Centerville,	Jan. 19-20,	2	5	110, 300, 75, 175, 300	....	3	192	960	
	Hogestown,	Jan. 21-22,	2	5	50, 150, 50, 150, 215	....	3	123	615	
(Special),	Carlisle,	Dec. 17,	1	1	140	....	1	140	140	2,530
Dauphin,	Gratz,	Dec. 31-Feb. 1,	2	5	225, 425, 50, 200, 500	....	5	280	1,400	
	Halifax,	Feb. 2-3,	2	5	45, 50, 40, 60, 80	....	5	55	275	
	Linglestown,	Feb. 4-5,	2	5	35, 225, 30, 100, 250	....	5	128	640	2,315
Delaware,	Village Green,	Feb. 18-19,	2	5	35, 130, 24, 55, 175	....	3	86	429	
	William School,	Feb. 21-22,	2	4	53, 64, 110, 325	1	3	110	552	981
Elk,	St. Marys,	Feb. 11-12,	2	5	26, 154, 19, 43, 71	1	3	64	322	
	Weedville,	Feb. 14,	1	3	34, 149, 142	....	3	108	325	647
Erie,	West Green,	Feb. 28-29,	2	4	80, 175, 200, 225	....	4	170	680	
	North East,	March 1-2,	2	5	80, 200, 125, 150, 250	....	4	161	805	
	Girard,	March 3-4,	2	5	50, 100, 100, 200, 250	....	4	140	700	2,185
Fayette,	Ohiopyle,	Nov. 19-20,	2	5	50, 350, 35, 125, 375	2	3	187	935	
	Old Frame,	Nov. 22-23,	2	5	60, 250, 75, 175, 400	4	3	192	960	
	Tippecanoe,	Nov. 24,	1	3	50, 100, 150	1	3	102	305	2,200
Forest,	Clarington,	Feb. 7-8,	2	5	112, 196, 102, 216, 309	5	3	187	935	
	Tionesta,	Feb. 9-10,	2	5	51, 214, 44, 101, 369	2	3	156	779	1,714
Franklin,	Dry Run,	Jan. 10-11,	2	5	90, 325, 90, 325, 350	1	3	236	1,180	
	Fannettsburg,	Jan. 12-13,	2	5	90, 150, 70, 200, 275	1	3	157	785	
	Scotland,	Jan. 14-15,	2	5	125, 275, 90, 210, 325	3	2	205	1,025	
	Marion,	Jan. 14-15,	2	5	80, 225, 50, 100, 260	2	2	143	715	
(Special),	Lemaster,	Nov. 29-30,	2	5	47, 125, 30, 100, 200	2	2	100	502	4,207
Fulton,	Rehobeth,	Jan. 18-19,	2	5	30, 60, 70, 100, 180	1	3	88	440	
	Clear Ridge,	Jan. 20-21,	2	5	45, 80, 68, 95, 183	....	3	94	471	911
Greene,	Jefferson,	Dec. 13-14,	2	5	75, 200, 150, 225, 250	1	3	180	900	
	Mt. Pleasant,	Dec. 15-16,	2	5	75, 150, 50, 150, 200	1	3	125	625	1,525
Huntingdon,	Spruce Creek,	Jan. 22,	1	3	35, 58, 150	5	2	81	243	
	Warriors Mark,	Feb. 7-8,	2	5	20, 125, 90, 55, 160	6	3	90	450	
	Markelsburg,	Feb. 9-10,	2	5	32, 225, 75, 78, 128	....	4	109	548	1,341
Indiana,	Elders Ridge,	Nov. 26,	1	2	40, 100	....	3	70	140	
	Shelocta,	Nov. 27,	1	3	35, 90, 175	....	3	100	300	
	Flora,	Nov. 29-30,	2	5	90, 125, 80, 100, 140	....	3	107	535	
	Pine Flats,	Dec. 1-2,	2	5	50, 250, 100, 200, 250	....	3	190	950	
	Wilgus,	Dec. 3-4,	2	5	120, 140, 120, 140, 160	....	3	136	680	
(Special),	East Mahoning,	Jan. 28,	1	2	89, 160	....	1	128	249	2,854
Jefferson,	Zions Church,	Feb. 16-17,	2	3	400, 412, 107, 223, 300	2	3	288	1,442	
	Beechwood,	Feb. 18,	1	2	64, 251	5	3	158	315	
	Brookville,	Dec. 10,	1	2	100	....	3	100	100	2,557
Juniata,	Richfield,	Feb. 16-17,	2	5	80, 316, 67, 219, 339	....	3	204	1,021	
	Port Royal,	Feb. 18-19,	2	5	102, 126, 45, 140, 127	1	3	332	540	1,661
Lackawanna,	Daleville,	Dec. 1-2,	2	5	43, 140, 32, 94, 160	....	4	113	565	
	Tompkinville,	Dec. 3-4,	2	5	48, 90, 28, 72, 80	1	4	59	296	
	Bald Mount,	Dec. 6-7,	2	5	35, 93, 68, 145, 245	1	4	115	576	1,437
Lancaster,	Blue Ball,	Nov. 19-20,	2	5	100, 125, 30, 100, 325	1	4	136	680	
	Lampeter,	Nov. 22-23,	2	5	70, 225, 45, 115, 275	1	4	146	730	
	Paradise,	Nov. 26-27,	2	5	70, 550, 60, 150, 550	1	4	277	1,385	
	Mechanicsville,	Nov. 29-30,	2	5	30, 225, 20, 150, 225	1	4	130	650	
	Lititz,	Dec. 1-2,	2	6	40, 75, 425, 55, 200, 575	1	4	229	1,370	

PENNSYLVANIA FARMERS' INSTITUTES—SEASON OF 1915-16—Continued.

County	Place	Date	Days of institute	Number of sessions	Attendance by Sessions	Speakers Present		Attendance		
						Local	State	Average	Total	By counties
	Maytown,	Dec. 3-4,	2	5	125, 375, 50, 150, 325	1	3	205	1,025	5,640
Lawrence,	Moravia,	Jan. 3-4,	2	5	75, 225, 75, 150, 250	1	4	155	775	
	Plain Grove,	Jan. 5-6,	2	5	75, 200, 100, 250, 200	....	4	165	825	
	Pulaski,	Jan. 7-8,	2	5	150, 225, 50, 175, 250	....	4	150	750	2,450
Lebanon,	Schaefferstown,	Jan. 3-4,	2	5	100, 250, 90, 150, 375	....	3	193	965	
	Annville,	Jan. 5-6,	2	5	50, 80, 40, 75, 175	....	3	84	320	
	Jonestown,	Jan. 7-8,	2	5	75, 115, 40, 100, 250	....	4	93	480	
(Special),	Schaefferstown,	Feb. 3,	1	1	100	1	1	100	100	
(Special),	Palmyra,	March 7,	1	1	95	1	....	95	95	2,170
Lehigh,	Pleasant Corner,	Jan. 17-18,	2	5	95, 145, 38, 160, 200	1	4	129	638	
	Seipstown,	Jan. 19-20,	2	5	170, 275, 79, 260, 285	3	4	212	1,069	
	Macungie,	Jan. 21-22,	2	5	62, 230, 48, 125, 245	0	4	142	710	2,417
Luzerne,	Hobie,	Dec. 13-14,	2	5	90, 225, 130, 270, 250	....	3	193	965	
	Bloomingdale,	Dec. 15-16,	2	5	65, 145, 240, 250, 315	....	3	203	1,015	
	Dallas,	Dec. 17-18,	2	5	50, 85, 125, 180, 260	....	3	134	690	2,570
Lycoming,	Friedens Church,	Feb. 29,	1	2	82, 154	1	3	118	236	
	Montgomery,	March 1-2,	2	5	83, 150, 42, 168, 253	1	3	139	696	
	Hughesville,	March 3-4,	2	5	160, 271, 40, 300, 400	2	4	234	1,171	2,103
McKean,	Kane,	Nov. 15-16,	2	5	10, 128, 20, 18, 142	....	4	64	318	
	Ceres,	Nov. 17-18,	2	5	78, 86, 41, 96, 101	1	4	80	402	720
Mercer,	Greenville,	Jan. 10-11,	2	5	100, 125, 150, 300, 200	3	4	165	825	
	Mercer,	Jan. 12-13,	2	5	125, 75, 75, 150, 100	....	5	105	525	
	London,	Jan. 14-15,	2	5	50, 125, 75, 150, 250	....	3	130	650	2,050
Mifflin,	McVeytown,	Feb. 11-12,	2	5	100, 430, 96, 132, 328	2	3	217	1,086	
	Milroy,	Feb. 14-15,	2	5	25, 318, 40, 70, 345	1	3	159	798	1,884
Monroe,	Stroudsburg,	Nov. 18-19,	2	4	20, 116, 32, 118	1	3	94	376	
	Tannersville,	Nov. 20,	1	3	14, 138, 155	....	3	102	307	
	Gilbert,	Nov. 22-23,	2	5	45, 160, 32, 145, 175	2	3	72	359	1,042
Montgomery,	Plymouth Meeting,	Feb. 9,	1	3	50, 200, 250	....	3	166	500	
	Center Point,	Feb. 10-11,	2	5	115, 355, 84, 160, 415	....	4	226	1,129	
	Harleyville,	Feb. 12,	1	3	114, 315, 425	....	4	285	854	
	Trappe,	Feb. 14-15,	2	5	70, 270, 75, 160, 250	....	4	151	755	
	East Greenville,	Feb. 16-17,	2	5	140, 400, 100, 160, 410	....	4	250	1,250	
(Movable Institute School),	King-of-Prussia,	Feb. 23,	1	3	60, 130, 200	....	3	130	390	4,878

Montour, ...	Mausdale, ...	Feb. 7-11, ...	4	10	25, 175, 15, 175, 12, 31, 235, 38, 80, 200	....	3	88	882	882
Northampton, ...	Nazareth, ...	Jan. 10-11, ...	2	5	80, 240, 170, 200, 275	2	4	193	965	
	Mt. Bethel, ...	Jan. 12-13, ...	2	5	75, 295, 52, 260, 325	1	4	201	1,007	
	Cherryville, ...	Jan. 14-15, ...	2	5	50, 315, 40, 200, 350	2	4	191	955	2,927
Northumberland, ...	Rebuck, ...	March 1-2, ...	2	5	75, 200, 210, 225, 275	....	3	197	985	
	McEwensville, ...	March 3-4, ...	2	5	75, 200, 165, 245, 275	....	3	192	960	
	Elysburg, ...	March 6, ...	1	3	30, 225, 248	1	3	168	503	
(Special), ...	Sunbury, ...	Jan. 29, ...	1	2	40, 60	....	1	50	100	2,548
Perry, ...	Ickesburg, ...	Dec. 20-21, ...	2	5	85, 275, 100, 200, 300	2	3	192	960	
	Green Park, ...	Dec. 22, ...	1	3	80, 225, 300	....	3	202	605	
	Rose Glen, ...	Dec. 23, ...	1	3	30, 100, 250	2	3	127	380	1,945
Philadelphia, ...	Hort. Hall, ...	Feb. 25-26, ...	2	3	28, 41, 182	1	3	84	251	251
Pike, ...	Greentown, ...	Jan. 17-18, ...	2	5	56, 40, 56, 350, 300	....	3	180	902	
	Paupack, ...	Jan. 19-20, ...	2	4	26, 158, 28, 224	....	3	109	436	
	Egypt Mills, ...	Jan. 21-22, ...	2	5	30, 176, 25, 54, 145	....	3	86	430	1,768
Potter, ...	Oswayo, ...	Nov. 19-20, ...	2	4	60, 90, 54, 165, 184	....	4	110	553	
	Genesee, ...	Nov. 22-23, ...	2	4	35, 168, 48, 166	....	4	103	412	
	Ulysses, ...	Nov. 24, ...	1	3	65, 115	....	3	206	612	1,363
Schuylkill, ...	Summit Station, ...	Jan. 3-4, ...	2	5	13, 130, 11, 124, 152	....	4	66	330	
	Klingerstown, ...	Jan. 5, ...	1	2	66, 160	....	3	114	228	
	Pitman, ...	Jan. 6-7, ...	2	4	125, 210, 145, 220	....	3	178	700	
	Andreas, ...	Jan. 7-8, ...	2	4	55, 105, 225, 320	....	3	174	695	1,958
Snyder, ...	Middleburg, ...	Feb. 21-22, ...	2	5	125, 400, 90, 225, 500	1	3	268	1,340	
	Mt. Pleasant Mills, ...	Feb. 22-24, ...	2	5	125, 380, 96, 145, 260	1	3	201	1,006	2,346
Somerset, ...	Boswell, ...	Jan. 5, ...	1	2	150, 260	....	3	205	410	
	Stoyestown, ...	Jan. 6, ...	1	3	60, 175, 200	....	3	145	435	
	Somerset, ...	Jan. 7-8, ...	2	6	30, 150, 160, 180, 175, 350	4	3	174	1,045	
	Berlin, ...	Jan. 10-11, ...	2	5	175, 325, 275, 300, 425	2	3	300	1,500	3,390
Sullivan, ...	Muncy Valley, ...	Dec. 10-11, ...	2	5	52, 95, 30, 84, 195	2	3	91	456	
	Colley, ...	Dec. 13-14, ...	2	5	28, 225, 30, 70, 212	....	3	113	565	1,021
Susquehanna, ...	Dimock, ...	Jan. 3, ...	1	2	54, 178	....	3	116	232	
	Harford, ...	Jan. 4-5, ...	2	4	72, 128, 112, 164	....	3	119	476	
	Clifford, ...	Jan. 6, ...	1	3	68, 175, 200	....	3	148	443	
	Thompson, ...	Jan. 7-8, ...	2	5	58, 184, 54, 126, 131	....	3	110	553	1,704
Tioga, ...	Westfield, ...	Nov. 26-27, ...	2	4	100, 200, 104, 127	....	3	142	531	
	Wellsboro, ...	Nov. 29-30, ...	2	4	125, 175, 108, 146	....	4	138	554	
	Jobs Corners, ...	Dec. 1, ...	1	3	145, 212, 240	....	4	176	597	
	Mansfield, ...	Dec. 2-3, ...	2	4	200, 432, 250, 450	....	4	444	1,332	
	Liberty, ...	Dec. 4, ...	1	3	240, 412, 615	....	4	422	1,267	4,271
Union, ...	Hartleton, ...	Feb. 26-27, ...	2	5	50, 100, 45, 75, 140	1	3	90	450	
	White Deer, ...	Feb. 28-29, ...	2	5	45, 150, 75, 140, 250	2	3	132	660	1,110
Venango, ...	Rockland, ...	Feb. 14-15, ...	2	5	50, 100, 35, 125, 175	1	4	97	485	
	Demseytown, ...	Feb. 16-17, ...	2	5	100, 200, 100, 225, 325	....	4	190	950	1,435
Warren, ...	Sugargrove, ...	Feb. 1-2, ...	2	5	53, 156, 51, 83, 144	2	3	99	487	
	Youngsville, ...	Feb. 3, ...	2	3	38, 85, 121	....	3	81	244	
	Warren, ...	Feb. 4-5, ...	2	4	28, 137, 43, 194	....	3	100	402	1,133
Washington, ...	Scenery Hill, ...	Nov. 15-16, ...	2	5	200, 250, 30, 100, 275	2	3	171	855	
	Ginger Hill, ...	Nov. 17-18, ...	2	5	50, 130, 60, 125, 300	1	3	133	665	
	Old Concord, ...	Nov. 19-20, ...	2	5	30, 150, 30, 150, 250	3	3	122	610	
(Special), ...	Scenery Hill, ...	Dec. 6, ...	1	1	135	....	1	135	135	
(Special), ...	Midway, ...	Dec. 30-31, ...	2	5	50, 125, 75, 125, 200	2	2	115	575	2,705

PENNSYLVANIA FARMERS' INSTITUTES—SEASON OF 1915-16—Continued.

County	Place	Date	Days of institute	Number of sessions	Attendance by Sessions	Speakers Present: Local	Speakers Present: State	Attendance: Average	Attendance: Total	Attendance: By counties
Wayne,	Orson,	Jan. 10,	1	3	46, 91, 88	....	3	73	225	
	Pleasant Mount,	Jan. 11-12,	2	5	142, 250, 49, 164, 200	....	3	161	805	
	Aldenville,	Jan. 13,	1	3	46, 104, 200	....	3	117	350	
	Honesdale,	Jan. 14-15,	2	4	68, 28, 50, 64	....	3	52	210	1,590
Westmoreland,	Scottdale,	Dec. 18-19,	2	5	140, 190, 65, 200, 375	1	3	194	970	
	Irwin,	Dec. 20,	1	3	75, 180, 275	1	3	177	530	
	Greensburg,	Dec. 21-22,	2	5	60, 100, 50, 120, 250	1	3	116	580	
	Latrobe,	Dec. 23,	1	3	60, 125, 250	1	3	145	435	
(Special),	Export,	Jan. 25-26,	2	5	94, 342, 192, 316, 412	5	2	271	1,356	3,771
Wyoming,	Tunkhannock,	Dec. 20-21,	2	5	35, 85, 40, 85, 150	1	3	113	565	
	East Lemon,	Dec. 22-23,	2	5	20, 45, 55, 64, 115	1	3	58	289	854
York,	Cross Roads,	Feb. 7-8,	2	5	100, 200, 100, 275, 300	....	3	195	975	
	Stewartstown,	Feb. 9-10,	2	5	150, 500, 150, 225, 500	2	3	305	1,525	
	New Freedom,	Feb. 11-12,	2	5	100, 350, 150, 350, 500	....	3	290	1,450	
	Dover,	Feb. 14-15,	2	5	200, 700, 160, 450, 900	1	4	482	2,410	
	Loganville,	Feb. 16-17,	2	5	150, 550, 150, 450, 500	1	4	360	1,800	
	Red Lion,	Feb. 18-19,	2	5	800, 1,500, 400, 800, 1,800	2	4	1,060	5,300	13,460
Total,	....	....	412	999		207	719			155,969

Days of Institutes:	
Institutes,	398
Schools,	3
Special Institutes,	11
Total,	412
Number of Sessions:	
Institutes,	929
Schools,	36
Special Institutes,	34
Total,	999

Speakers Present:	
State,	719
Local,	207
Total,	926
Number in Attendance:	
Farmers' Institutes,	146,258
Movable Institute Schools,	5,297
Special Institutes,	4,414
Total,	155,969

ANNUAL NORMAL INSTITUTE

Our Annual Normal Institute was held at Reading, May 23-25, 1916. This meeting was attended by the Institute Managers from the different counties of the State, and practically all the State Lecturers, as well as representatives of Agricultural Associations, Local Granges and Farmers' Clubs.

Herewith find program, which gives in detail subjects that were discussed by competent instructors.

PROGRAM.

First Session Convenes Tuesday Afternoon, May 23, 1916.

HON. HOWARD G. McGOWAN, Geigers Mills, Pa., Chairman.

Call to Order 1.30 P. M.

Addresses of Welcome, Hon. Harry D. Schaeffer, Judge of Orphans' Court, Reading, Pa.
Jas. P. Hennessy, President Berks County Agri. and Hort. Association, Reading, Pa.
President Chambers of Commerce, Reading, Pa.

Responses, Hon. Charles E. Patton, Secretary of Agriculture, Harrisburg, Pa.
E. B. Dorsett, Farm Adviser, Mansfield, Pa.

1. **"POTATO CULTURE."**
H. M. Anderson, New Park, Pa.

Tuesday Evening, May 23, 1916.

GOOD ROADS SESSION.

MR. B. F. KILLAM, Paupack, Pa., Chairman.

Call to Order 7.30 P. M.

Opened by Hon. Martin G. Brumbaugh, Governor of Pennsylvania, Harrisburg, Pa.

1. **"PENNSYLVANIA HIGHWAY SYSTEM." (Illustrated.)**
W. D. Uhler, Chief Engineer, Pennsylvania State Highway Department.

2. **"NATIONAL ROAD CONSTRUCTION."**
Hon. Henry A. Barnhart, Member of Congress, Committee on Roads, Washington, D. C.

GENERAL DISCUSSION.

Wednesday Morning, May 24, 1916.

HON. ROBT. W. LOHR, Boswell, Pa., Chairman.

Call to Order 9.30 A. M.

1. **"THE NECESSITY OF LIME IN PENNSYLVANIA AGRICULTURE."**
W. M. Patton, Mosgrove, Pa.

2. "CROP ROTATION."
Prof. Franklin Menges, York, Pa.

3. "ALFALFA AND HOW TO GROW IT."
W. D. Zinn, Phillipy, W. Va.

Wednesday Afternoon, May 24, 1916.

DR. M. E. CONARD, Westgrove, Pa., Chairman.

Call to Order 1.30 P. M.

1. "COMMUNITY BREEDING."
Prof. Helmar Rabild, U. S. Department of Agriculture, Washington, D. C.

2. "DAIRY CATTLE FEEDING."
Prof. A. J. Borland, State College, Pa.

3. "ECONOMIC FACTORS IN BEEF PRODUCTION."
Prof. W. H. Tomhave, Department of Animal Husbandry, State College, State College, Pa.

Wednesday Evening, May 24, 1916.

POULTRY SESSION.

MR. J. H. SCHULTZ, Norristown, Pa., Chairman.

Call to Order 7.30 P. M.

1. "THE MARKETING OF POULTRY PRODUCTS." (Demonstrated.)
E. L. Phillips, New Bethlehem, Pa.

2. "MODERN FARM POULTRY MANAGEMENT." (Illustrated.)
Prof. H. R. Lewis, Department of Poultry Husbandry, New Jersey Experiment Station, New Brunswick, N. J.

GENERAL DISCUSSION.

Thursday Morning, May 25, 1916.

INSTITUTE SESSION.

HON CHAS. E. CAROTHERS, Director, Harrisburg, Pa., Chairman.

Call to Order 9.00 A. M.

THIS SESSION WILL BE DEVOTED TO THE DEVELOPMENT OF QUESTIONS RELATING TO INSTITUTE AND ADVISORY WORK THROUGHOUT THE STATE.

Opened by the Director.

1. "A BRIEF REVIEW OF THE PAST YEAR'S WORK BY SECTION LEADERS."

Sheldon W. Funk, Boyertown, Pa.
D. H. Watts, Kerrmoor, Pa.
E. B. Dorsett, Mansfield, Pa.
W. M. Patton, Mosgrove, Pa.
J. T. Campbell, Hartstown, Pa.

2. "THE FARMERS' INSTITUTE FROM THE COUNTY CHAIRMAN'S POINT OF VIEW."

3. "FIELD EXPERIENCE AND SUGGESTIONS OF FARM ADVISERS."

Note.—This session is open for discussion to all County Chairmen of Institutes and Lecturers and it is expected that each member will come prepared to offer a suggestion looking to the development of the work. Five minutes time is allotted to each member.

Thursday Afternoon, May 25, 1916.

MR. M. H. McCALLUM, Wernersville, Pa., Chairman.

Call to Order 1.30 P. M.

THIS SESSION WILL BE DEVOTED TO THE DEVELOPMENT OF "BETTER MARKETING FACILITIES."

Discussion opened by E. B. Dorsett, Mansfield, Pa.

1. "PREPARATION FOR MARKET."

Sheldon W. Funk, Boyertown, Pa.

2. "PUBLICITY AND ADVERTISING."

Howard W. Selby, Philadelphia, Pa.

GENERAL DISCUSSION.

Thursday Evening, May 25, 1916.

DR. HANNAH McK. LYONS, Lincoln University, Pa., Presiding.

Call to Order 7.30 P. M.

1. "A BRIEF REVIEW OF FARMERS' INSTITUTES OF 25 OR 30 YEARS AGO."

M. S. Bond, Danville, Pa.

2. "VITAL FACTORS IN RURAL IMPROVEMENTS."

D. H. Watts, Kerrmoor, Pa.

3. "SONGS THAT LIVE."

Mrs. Rose Morgan, 400 Convent St., New York City.

LIST OF COUNTY INSTITUTE MANAGERS FOR THE SEASON OF 1916-17

County	Name and Address of Chairmen
Adams,	A. I. Weidner, Arendtsville.
Allegheny,	C. L. Hood, Coraopolis, R. D. No. 3.
Armstrong,	S. S. Blyholder, Kelly Station.
Beaver,	Walter C. Dunlap, West Bridgewater.
Bedford,	W. F. Biddle, Everett, R. D. No. 2.
Berks,	H. G. McGowan, Geigers Mills.
Blair,	W. Frank Beck, Altoona.
Bucks,	B. F. Wambold, Sellersville.
Bradford,	Louis Piollet, Wysox.
Butler,	W. H. Milliron, Marwood.
Cambria,	L. J. Bearer, Hastings.
Cameron,	R. P. Heilman, Emporium.
Carbon,	Edw. W. Leinhard, Lehighton, R. D. No. 2
Centre,	John A. Woodward, Howard.
Chester,	M. E. Conard, Westgrove.
Clarion,	J. H. Wilson, Clarion.
Clearfield,	T. L. Way, Clearfield.
Clinton,	Joel A. Herr, Millhall.
Columbia,	A. C. Creasy, Bloomsburg.
Crawford,	W. F. Throop, Espyville.
Cumberland,	T. J. Ferguson, Mechanicsburg.
Dauphin,	E. S. Keiper, Middletown.
Delaware,	Thos. H. Wittkorn, Media.
Elk,	John G. Schmidt, St. Marys.
Erie,	D. Warren De Rosay, Corry.
Fayette,	John T. Smith, Dunbar, R. D. No. 32
Forest,	C. A. Randall, Tionesta.
Franklin,	J. P. Young, Marion.
Fulton,	Frank Ranck, Hancock, Md., R. D
Greene,	J. W. Stewart, Jefferson.
Huntingdon,	G. G. Hutchison, Warriors Mark.
Indiana,	S. C. George, West Lebanon.
Jefferson,	Peter B. Cowan, Brookville.
Juniata,	Matthew Rodgers, Mexico.
Lackawanna,	Horace Seamans, Factoryville.
Lancaster,	J. W. Bruckhart, Lititz.
Lawrence,	D. L. Fulkman, New Wilmington.
Lebanon,	Edward Shuey, Annville, R. D.
Lehigh,	P. S. Fenstermacher, Allentown.
Luzerne,	J. E. Hildebrant, Dallas.
Lycoming,	B. F. Kahler, Hughesville.
McKean,	E. A. Studholme, Smethport.
Mercer,	Wm. C. Black, Mercer.

County	Name and Address of Chairmen
Mifflin,	C. M. Smith, Lewistown.
Monroe,	F. S. Brong, Saylorsburg.
Montgomery,	J. H. Schultz, Norristown.
Montour,	J. Miles Derr, Milton, R. D. No. 1.
Northampton,	C. S. Messinger, Tatamy.
Northumberland,	Wm. A. Fisher, Milton.
Philadelphia,	David Rust, Horticultural Hall, Philadelphia.
Perry,	C. M. Bower, Blain.
Pike,	B. F. Killam, Paupack.
Potter,	A. T. Crittenden, Oswayo.
Schuylkill,	John Shoener, Orwigsburg, R. D. No. 1.
Snyder,	F. F. Glass, Freeburg.
Somerset,	Robt. W. Lohr, Boswell.
Sullivan,	G. Eugene Bown, Forksville.
Susquehanna,	E. E. Tower, Hallstead.
Tioga,	C. H. DeWitt, Mansfield.
Union,	J. Newton Glover, Vicksburg.
Venango,	Homer C. Crawford, Cooperstown.
Warren,	R. J. Weld, Sugargrove.
Washington,	Jas. M. Paxton, Houston.
Wayne,	W. E. Perham, Varden.
Westmoreland,	W. F. Holtzer, Greensburg.
Wyoming,	G. A. Benson, Tunkhannock.
York,	G. F. Barnes, Rossville.

LIST OF INSTITUTE LECTURERS FOR SEASON OF 1915-1916

Anderson, H. M., New Park, Pa.
Barnitz, C. M., Riverside, Pa.
Bechdel, S. I., Department of Dairy Husbandry, State College, Pa.
Bond, M. S., Danville, Pa.
Buckley, G. C., State College, Pa.
Campbell, J. T., Hartstown, Pa.
Card, Fred W., Sylvania, Pa.
Conard, Dr. M. E., Westgrove, Pa.
Dorsett, E. B., Mansfield, Pa.
Fassett, F. H., Meshoppen, Pa.
Funk, Sheldon W., Boyertown, Pa.
George, S. C., West Lebanon, Pa.
Gillingham, G. L., Moorestown, N. J.
Gooderham, H. M., Patton, Pa.
Groupe, J. Stuart, Jersey Shore, Pa.
Guldin, Paul R., Yellow House, Pa.
Herman, J. A., Fombell, Pa.
Herr. John D., Lancaster, Pa.
Hulsart, C. C., Matawan, N. J.
Hull, Geo. E., Sharpsville, Pa.
Lighty, L. W., East Berlin, Pa.
Lyons, Dr. Hannah McK., Lincoln University, Pa.
McCallum, M. H., Wernersville, Pa.
McCurdy, C. C., Hartstown, Pa.
Mairs, Prof. Thos. I., State College, Pa.
Menges, Prof. Franklin, York, Pa.
Myers, C. E., State College, Pa.
Noll, Chas. F., State College, Pa.
Orton, Prof. C. R., State College, Pa.
Patton, Wm. M., Mosgrove, Pa., R. F. D. No. 2.
Philips, T. J., Atglen, Pa.
Phillips, E. L., New Bethlehem, Pa., R. F. D. No. 2.
Phillipy, Dr. W. T., Carlisle, Pa.
Putney, F. S., State College, Pa.
Rosenberger, Dr. John N., Wycombe, Pa.
Seeds, Robt. S., Birmingham, Pa.
Smith, Raymond S., State College, Pa.
Stout, W. H., Pinegrove, Pa.
Struble, Vern T., Athens, Pa.
Umholtz, R. O., Sacramento, Pa.
Van Noy, Leon Otice, Troy, Pa., R. F. D. No. 66.
Watts, D. H., Kermoor, Pa.
White, W. R., State College, Pa.
Wittman, W. Theo., Allentown, Pa
Wrigley, Paul I., Eddington, Pa.
Weld, R. J., Sugargrove, Pa.

THE FOLLOWING IS A LIST OF SPEAKERS AND THEIR ASSIGNMENTS SEASON OF 1915-1916

H. M. ANDERSON, New Park, York County, Pa.

	Date.	Place.	County.
Jan.	3-4,	Schaefferstown,	Lebanon.
Jan.	5-6,	Annville,	Lebanon.
Jan.	7-8,	Jonestown,	Lebanon.
Jan.	10-11,	Dry Run,	Franklin.
Jan.	12-13,	Fannettsburg,	Franklin.
Jan.	14,	Marion,	Franklin.
Jan.	15,	Scotland,	Franklin.

C. M. BARNITZ, Riverside, Northumberland County, Pa.

Nov.	19-20,	Blue Ball,	Lancaster.
Nov.	22-23,	Lampeter,	Lancaster.
Nov.	26-27,	Paradise,	Lancaster.
Nov.	29-30,	Mechanicsville,	Lancaster.
Dec.	1-2,	Lititz,	Lancaster.
Dec.	3-4,	Maytown,	Lancaster.
Jan.	3-4,	Moravia,	Lawrence.
Jan.	5-6,	Plaingrove,	Lawrence.
Jan.	7-8,	Pulaski,	Lawrence.
Jan.	10-11,	Greenville,	Mercer.
Jan.	12-13,	Mercer,	Mercer.
Jan.	14-15,	London,	Mercer.
Feb.	1-2,	Sugargrove,	Warren.
Feb.	3,	Youngsville,	Warren.
Feb.	4-5,	Warren,	Warren.
Feb.	7-8,	Tionesta,	Forest.
Feb.	9-10,	Clarington,	Forest.
Feb.	23-24,	Woolrich,	Clinton.

G. C. Buckley, State College, Centre County, Pa.

Jan.	10-11,	Greenville,	Mercer.
Jan.	12,,	Mercer,	Mercer.

S. I. BECHDEL, Department of Dairy Husbandry, State College, Centre County, Pa.

Dec.	13-14,	Millheim,	Centre.
Dec.	15-16,	Pine Grove Mills,	Centre.

M. S. BOND, Danville, Montour County, Pa.

Jan.	3-4,	Summit,	Schuylkill.
Jan.	5,	Klingerstown,	Schuylkill.
Jan.	6,	Pitman,	Schuylkill.
Jan.	7-8,	Andreas,	Schuylkill.

J. T. CAMPBELL, Hartstown, Crawford County, Pa.

Will attend all meetings in the Fifth Section.

FRED W. CARD, Sylvania, Bradford County, Pa.

Will attend all meetings in the Fifth Section Nov. 24 to Dec. 23, and the Third Section from Jan. 14 to March 4.

DR. M. E. CONARD, Westgrove, Chester County, Pa.

	Date.	Place.	County.
Nov.	15-16,	Kane,	McKean.
Nov.	17-18,	Ceres,	McKean.
Nov.	19-20,	Oswayo,	Potter.
Nov.	22-23,	Genessee,	Potter.
Nov.	24,	Ulysses,	Potter.
Jan.	6,	Jerseytown,	Columbia.
Jan.	7-8,	Numidia,	Columbia.
Jan.	10-11,	Mausdale,	Montour.
Jan.	12-13,	Salix,	Cambria.

PROF. WELLS W. COOKE, U. S. Dept. of Agriculture, Washington, D. C.

Nov.	29-30,	Mechanicsville,	Lancaster.
Dec.	1-2,	Lititz,	Lancaster.
Dec.	3-4,	Maytown,	Lancaster.
Feb.	1-2,	Sugargrove,	Warren.
Feb.	3,	Youngsville,	Warren.
Feb.	4-5,	Warren,	Warren.
Feb.	7-8,	Tionesta,	Forest.
Feb.	9-10,	Clarington,	Forest.
Feb.	11-12,	St. Mary's	Elk.
Feb.	14-15,	Weedville,	Elk.

W. H. DARST, State College, Centre County, Pa.

Jan.	10-11,	Nazareth,	Northampton.
Jan.	12-13,	Mount Bethel,	Northampton.
Jan.	14-15,	Cherryville,	Northampton.

E. B. DORSETT, Mansfield, Tioga County, Pa.

Will attend all meetings in the Third Section.

F. H. FASSETT, Meshoppen, Wyoming County, Pa.

Will attend all meetings in the Third Section from Nov. 15 to Dec. 4, and Jan. 14 to March 4; Movable Institute Schools Jan. 4-5, Jerseytown, Jan. 6, Numidia, Jan. 7-8, Mausdale, Jan. 10-11, Salix.

SHELDON W. FUNK, Boyertown, Berks County, Pa.

Will attend all meetings in the First Section.

S. C. GEORGE, West Lebanon, Indiana County, Pa.

Date.	Place.	County.
Jan. 31-Feb. 1,	Gratz,	Dauphin.
Feb. 2-3,	Halifax,	Dauphin.
Feb. 4-5,	Linglestown,	Dauphin.

G. L. GILLINGHAM, Moorestown, N. J.

Nov. 26-27,	Westfield,	Tioga,
Nov. 29-30,	Wellsboro,	Tioga,
Dec. 1,	Jobs Corner,	Tioga,
Dec. 2-3,	Mansfield,	Tioga,
Dec. 4,	Liberty,	Tioga,
Dec. 10-11,	Muncy Valley,	Sullivan,
Dec. 13-14,	Colley,	Sullivan,
Dec. 15-16,	Wilmont,	Bradford.
Dec. 17-18,	Stevensville,	Bradford.
Dec. 20-21,	Lime Hill,	Bradford.
Dec. 22-23,	Rome,	Bradford.

H. M. GOODERHAM, Patton, Cambria County, Pa.

Jan. 3,	Dimock,	Susquehanna,
Jan. 4-5,	Harford,	Susquehanna,
Jan. 6,	Clifford,	Susquehanna,
Jan. 7-8,	Thompson,	Susquehanna,
Jan. 10,	Orson,	Wayne,
Jan. 11-12,	Pleasant Mt.,	Wayne,
Jan. 13,	Aldenville,	Wayne,
Jan. 14-15,	Honesdale,	Wayne,
Jan. 17-18,	Greentown,	Pike,
Jan. 19-20,	Paupack,	Pike,
Jan. 21-22,	Egypt Mills,	Pike,

J. STUART GROUPE, Jersey Shore, Lycoming County, Pa.

Nov. 19-20,	Ohiopyle,	Fayette.
Nov. 22-23,	Old Frame,	Fayette.
Nov. 24,	Tippecanoe,	Fayette.
Nov. 26,	Elders Ridge,	Indiana.
Nov. 27,	Shelocta,	Indiana.
Nov. 29-30,	Flora,	Indiana.
Dec. 1,2-	Pine Flats,	Indiana.
Dec. 3-4,	Wilgus,	Indiana.
Feb. 11-12,	St. Mary's,	Elk.
Feb. 14-15,	Weedville,	Elk.
Feb. 16-17,	Zion Church,	Jefferson.
Feb. 18-19,	Beachwood,	Jefferson.
Feb. 21-22,	Emporium,	Cameron.

PAUL R. GULDIN, Yellow House, Berks County, Pa.

Nov. 15-16,	Kane,	McKean.
Nov. 17-18,	Ceres,	McKean.
Nov. 19-20,	Oswayo,	Potter.
Nov. 22-23,	Genesee,	Potter.
Nov. 24,	Ulysses,	Potter.

J. A. HERMAN, Fombell, Beaver County, Pa.

	Date.	Place.	County.
Nov.	15-16,	Scenery Hill,	Washington.
Nov.	17-18,	Ginger Hill,	Washington.
Nov.	19-20,	Old Concord,	Washington.
Nov.	22-23,	Hanover U. P. Church,	Beaver.
Nov.	24-25,	Ohio Grange Hall,	Beaver.
Nov.	26-27,	Chippewa Grange Hall,	Beaver.
Nov.	29-30,	Millerstown,	Allegheny.
Dec.	1-2,	Perrysville,	Allegheny.
Dec.	3-4,	Mt. Union,	Allegheny.

JOHN D. HERR, Lancaster, Lancaster County, Pa.

Jan.	3-4,	Summit,	Schuylkill.
Jan.	5,	Klingerstown,	Schuylkill.
Jan.	6,	Pitman,	Schuylkill.
Jan.	7-8,	Andreas,	Schuylkill.
Jan.	10-11,	Nazareth,	Northampton.
Jan.	12-13,	Mount Bethel,	Northampton.
Jan.	14-15,	Cherryville,	Northampton.
Jan.	17-18,	Pleasant Corner,	Lehigh.
Jan.	19-20,	Seipstown,	Lehigh.
Jan.	21-22,	Macungie,	Lehigh.
Jan.	31-Feb. 1,	Springtown,	Bucks.
Feb.	2-3,	Sellersville,	Bucks.
Feb.	4,	Bristol,	Bucks.
Feb.	5,	New Hope,	Bucks.
Feb.	7-8,	Newtown,	Bucks.

C. C. HULSART, Matawan, N. J.

Nov.	18-19,	Monroe Grange,	Monroe.
Nov.	20,	Tannersville,	Monroe.
Nov.	22-23,	Gilbert,	Monroe.
Nov.	24-25,	Big Creek,	Carbon.
Nov.	26-27,	Mahoning,	Carbon.
Feb.	9,	Weatherly,	Carbon.
Nov.	29-30,	Plymouth Meeting,	Montgomery.
Feb.	10-11,	Worcester,	Montgomery.
Feb.	12,	Harleysville,	Montgomery.
Feb.	14-15,	Trappe,	Montgomery.
Feb.	16-17,	East Greenville,	Montgomery.
Feb.	18-19,	Village Green,	Delaware.
Feb.	21-22,	Williamson School,	Delaware.
Feb.	23-24,	Philadelphia,	Philadelphia.
Feb.	25-26,	Mackeyville,	Clinton.
Feb.	28,	Loganton,	Clinton.
Feb.	29,	Friedens Church,	Lycoming.
March	1-2,	Montgomery,	Lycoming.
March	3-4,	Hughesville,	Lycoming.

GEO. E. HULL, Sharpsville, Mercer County, Pa.

	Date.	Place.	County.
Jan.	14-15,	Rockland,	Venango.
Jan.	16-17,	Dempseytown,	Venango.
Jan.	18-19,	Cochranton,	Crawford.

L. W. LIGHTY, East Berlin, Adams County, Pa.

Nov.	15-16,	Kane,	McKean.
Nov.	17-18,	Ceres,	McKean.
Nov.	19-20,	Oswayo,	Potter.
Nov.	22-23,	Genessee,	Potter.
Nov.	24,	Ulysses,	Potter.
Nov.	26-27,	Westfield,	Tioga.
Nov.	29-30,	Wellsboro,	Tioga.
Dec.	1,	Jobs Corner,	Tioga.
Dec.	2-3,	Mansfield,	Tioga.
Dec.	4,	Liberty,	Tioga.
Dec.	10-11,	Muncy Valley,	Sullivan.
Dec.	13-14,	Colley,	Sullivan.
Dec.	15-16,	Wilmont,	Bradford.
Dec.	17-18,	Stevensville,	Bradford.
Dec.	20-21,	Lime Hill,	Bradford.
Dec.	22-23,	Rome,	Bradford.
Feb.	21-22,	Balley,	Berks.
Feb.	23-24,	Mt. Aetna,	Berks.
Feb.	25-26,	Temple,	Berks.
Feb.	28,	Jacksonwald,	Berks.
Feb.	29,	Geigertown,	Berks.
March	1-2,	Cedarville,	Chester.
March	3-4,	Beyers,	Chester.
March	6-7,	Parkesburg,	Chester.
March	8-9,	Doe Run,	Chester.

DR. HANNAH McK. LYONS, Lincoln University, Chester County, Pa.

Jan.	6,	Jerseytown,	Columbia.
Jan.	7-8,	Numidia,	Columbia.
Jan.	10-11,	Mausdale,	Montour.
Jan.	12-13,	Salix,	Cambria.
Feb.	7-8,	Clarion,	Clarion.
Feb.	9,	Miola,	Clarion.
Feb.	10,	Frogtown,	Clarion.
Feb.	11-12,	Sligo,	Clarion.
Feb.	16-17,	Zion Church,	Jefferson.
Feb.	18-19,	Beachwood,	Jefferson.
Feb.	21-22,	Emporium,	Cameron.
Feb.	23-24,	Woolrich,	Clinton.
Feb.	25-26,	Mackeyville,	Clinton.
Feb.	28,	Loganton,	Clinton.
Feb.	29,	Friedens Church,	Lycoming.
March	1-2,	Montgomery,	Lycoming.
March	3-4,	Hughesville,	Lycoming.

PROF. THOS. I. MAIRS, State College, Centre County, Pa.

Date.		Place.	County.
Nov.	18-19,	Monroe Grange,	Monroe.
Nov.	20,	Tannersville,	Monroe.
Nov.	22-23,	Gilbert,	Monroe.

M. H. McCALLUM, Wernersville, Berks County, Pa.

Will attend all meetings in the Second Section from Dec. 13 to Feb. 19.

C. C. McCURDY, Hartstown, Crawford County, Pa.

Nov.	26,	Elders Ridge,	Indiana.
Nov.	27,	Shelocta,	Indiana.
Nov.	29-30,	Flora,	Indiana.
Dec.	1-2,	Pine Flats,	Indiana.
Dec.	3-4,	Wilgus,	Indiana.

PROF. FRANKLIN MENGES, York, York County, Pa.

Jan.	3-4,	Summit,	Schuylkill.
Jan.	5,	Klingerstown,	Schuylkill.
Jan.	6,	Pitman,	Schuylkill.
Jan.	7-8,	Andreas,	Schuylkill.
Jan.	10-11,	Nazareth,	Northampton.
Jan.	12-13,	Mount Bethel,	Northampton.
Jan.	14-15,	Cherryville,	Northampton.
Jan.	17-18,	Newburg,	Cumberland.
Jan.	19-20,	Centerville,	Cumberland.
Jan.	21-22,	Hogestown,	Cumberland.

C. E. MYERS, State College, Centre County, Pa.

Nov.	29-30,	Mechanicsville,	Lancaster.
Dec.	1-2,	Lititz,	Lancaster.
Dec.	3-4,	Maytown,	Lancaster.

CHAS. F. NOLL, State College, Centre County, Pa.

Feb.	14-15,	Dover,	York.
Feb.	16-17,	Loganvile,	York.
Feb.	18-19,	Red Lion,	York.

PROF. C. R. ORTON, State College, Centre County, Pa.

Nov.	19-20,	Ohiopyle,	Fayette.
Nov.	22-23,	Old Frame,	Fayette.
Nov.	24,	Tippecanoe,	Fayette.

WM. M. PATTON, Mosgrove, R. D. No. 2, Armstrong County, Pa.

Will attend all meetings in the Fourth Section.

T. J. PHILIPS, Atglen, Chester County, Pa.

	Date.	Place.	County.
Dec.	20,	Irwin,	Westmoreland.
Dec.	21-22,	Greensburg,	Westmoreland.
Dec.	23,	Latrobe,	Westmoreland.

E. L. PHILLIPS, New Bethlehem, R. D. No. 2, Clarion County, Pa.

Will attend all meetings in the First Section from Dec. 13 to Dec. 23 and Jan. 10 to March 9.

DR. W. T. PHILLIPY, Carlisle, Cumberland County, Pa.

Jan.	3,	Dimock,	Susquehanna.
Jan.	4-5,	Harford,	Susquehanna.
Jan.	6,	Clifford,	Susquehanna.
Jan.	7-8,	Thompson,	Susquehanna.

F. S. PUTNEY, State College, Centre County, Pa.

Nov.	19-20,	Blue Ball,	Lancaster.
Nov.	22-23,	Lampeter,	Lancaster.
Nov.	26-27,	Paradise,	Lancaster.

ROBT. S. SEEDS, Birmingham, Huntingdon County, Pa.

Dec.	13-14,	Jefferson,	Greene.
Dec.	15-16,	Mt. Pleasant Church,	Greene.
Dec.	17-18,	Scottdale,	Westmoreland.
Dec.	20,	Irwin,	Westmoreland.
Dec.	21-22,	Greensburg,	Westmoreland.
Dec.	23,	Latrobe,	Westmoreland.
Jan.	3-4,	Moravia,	Lawrence.
Jan.	5-6,	Plaingrove,	Lawrence.
Jan.	7-8,	Pulaski,	Lawrence.

RAYMOND S. SMITH, State College, Centre County, Pa..

Jan.	3-4,	Schaefferstown,	Lebanon.
Jan.	5-6,	Annville,	Lebanon.
Jan.	7-8,	Jonestown,	Lebanon.

W. H. STOUT, Pinegrove, Schuylkill County, Pa.

Feb.	29,	Friedens Church,	Lycoming.
March	1-2,	Montgomery,	Lycoming.
March	3-4,	Hughesville,	Lycoming.

VERN T. STRUBLE, Athens, Bradford County, Pa.

Date.	Place.	County.
Nov. 24-25,	Big Creek,	Carbon.
Nov. 26-27,	Mahoning,	Carbon.
Nov. 29-30,	Weatherly,	Carbon.
Dec. 1-2,	Daleville,	Lackawanna.
Dec. 3-4,	Tompkinsville,	Lackawanna.
Dec. 6-7,	Bald Mount,	Lackawanna.
Dec. 13-14,	Hobbie,	Luzerne.
Dec. 15-16,	Bloomingdale,	Luzerne.
Dec. 17-18,	Dallas,	Luzerne.
Dec. 20-21,	Tunkhannock,	Wyoming.
Dec. 22-23,	East Lemon,	Wyoming.
Feb. 28-29,	White Deer Church,	Northumberland.
March 1-2,	Rebuck,	Northumberland.
March 3-4,	McEwensville,	Northumberland.
March 6,	Elysburg,	Northumberland.

PROF. W. H. TOMHAVE, State College, Centre County, Pa.

Jan. 13,	Mercer,	Mercer.

R. O. UMHOLTZ, Sacramento, Schuylkill County, Pa.

Jan. 3-4,	Benshoff Church,	Cambria.
Jan. 5,	Boswell,	Somerset.
Jan. 6,	Stoyestown,	Somerset.
Jan. 7-8,	Somerset,	Somerset.
Jan. 10-11,	Berlin,	Somerset.
Jan. 12-13,	Cessna,	Bedford.

LEON OTICE VAN NOY, Troy, R. D. No. 66, Bradford County, Pa.

Jan. 10,	Orson,	Wayne.
Jan. 11-12,	Pleasant Mt.,	Wayne.
Jan. 13,	Aldenville,	Wayne.
Jan. 14-15,	Honesdale,	Wayne.
Jan. 17-18,	Greentown,	Pike.
Jan. 19-20,	Paupack,	Pike.
Jan. 21-22,	Egypt Mills,	Pike.
Jan. 31-Feb. 1,	Springtown,	Bucks.
Feb. 2-3,	Sellersville,	Bucks.
Feb. 4,	Bristol,	Bucks.
Feb. 5,	New Hope,	Bucks.
Feb. 7-8,	Newtown,	Bucks.
Feb. 9,	Plymouth Meeting,	Montgomery.
Feb. 10-11,	Worcester,	Montgomery.
Feb. 12,	Harleysville,	Montgomery.
Feb. 14-15,	Trappe,	Montgomery.
Feb. 16-17,	East Greenville,	Montgomery.
Feb. 17-18,	Village Green,	Delaware.
Feb. 21-22,	Williamson School,	Delaware.
Feb. 23-24,	Philadelphia,	Philadelphia.

D. H. WATTS, Kerrmoor, Clearfield County, Pa.

Will attend all meetings in the Second Section.

JNO. W. WHITE, State College, Centre County, Pa.

	Date.	Place.	County.
Feb.	21-22,	Middleburg,	Snyder.
Feb.	23-24,	Mt. Pleasant Mills,	Snyder.
Feb.	25-26,	Hartleton,	Union.

W. R. WHITE, State College, Centre County, Pa.

Dec.	1-2,	Daleville,	Lackawanna.
Dec.	3-4,	Tompkinsville,	Lackawanna.
Dec.	6-7,	Bald Mount,	Lackawanna.

W. THEO. WITTMAN, Allentown, Lehigh County, Pa.

Will attend all meetings in the Second Section from Dec. 1 to 23; Jan. 14 to March 6, and Movable Institute Schools Jan. 4-5 Jerseytown, Jan. 6 Numidia, Jan. 7-8 Mausdale, Jan. 10-11 Salix.

E. L. WORTHEN, State College, Centre County, Pa.

Dec.	13-14,	Jefferson,	Greene.
Dec.	15-16,	Mt. Pleasant Church,	Greene.
Dec.	17-18,	Scottdale,	Westmoreland.

PAUL I. WRIGLEY, Eddington, Bucks County, Pa.

Dec.	13-14,	Arendtsville,	Adams.
Dec.	15-16,	Fairfield,	Adams.
Dec.	17-18	New Oxford,	Adams.
Dec.	20-21,	Ickesburg,	Perry.
Dec.	22-23,	Greenpark,	Perry.

R. J. WELD, Sugargrove, Warren County, Pa.

Jan.	6,	Jerseytown,	Columbia.
Jan.	7-8,	Numidia,	Columbia.
Jan.	10-11,	Mausdale,	Montour.
Jan.	12-13,	Salix,	Cambria.
Jan.	17-18,	Pleasant Corner,	Lehigh.
Jan.	19-20,	Seipstown,	Lehigh.
Jan.	21-22,	Macungie,	Lehigh.
Feb.	7-8,	Cross Roads,	York.
Feb.	9-10,	Stewartstown,	York.
Feb.	11-12,	New Freedom,	York.

CONCLUSION

After going over this report as recorded above, I think you will agree with me that for an expenditure of $20,000.00 in the Institute work and $20,000.00 in the advisory work, we have been very successful. And when we stop to consider that our neighboring states are paying instructors from 30 to 50% more than we we do for the same class of work, it is only fair to our lecturers as well as the communities requesting additional number of days of Institutes that I recommend the next legislature be more liberal in our appropriations as I fear we will lose some very valuable men unless we can offer them a more liberal contract in the way of per diem pay. And while I know the funds of the State are extremely limited, I sincerely hope that it can grant $50,000.00 for the Institute work and $50,000.00 for the farm advisory work during the session of 1917.

In conclusion, I wish to thank you for your kind co-operation in making this work a success.

Very respectfully your,

C. E. CAROTHERS,
Director of Farmers' Institutes.

REPORT OF THE DAIRY AND FOOD BUREAU

Harrisburg, Pa., *December 31, 1916.*

Hon. Charles E. Patton, Secretary of Agriculture.

Dear Sir: I have the honor to submit herewith a report of the Dairy and Food Bureau of the Department of Agriculture, for the year ending December 31, 1916. It covers the operations for the year and contains some details that may be useful for public information.

THE GENERAL FEATURES OF THE BUREAU'S WORK DURING 1916

The general aims and policies of the Bureau have been so fully presented in the reports of recent years that they require no discussion at the present time, nor is there need for repeating them in this connection. The statements made in my preliminary report for 1915 regarding the scope and detail of the several classes of laws committed to the Dairy and Food Commissioner for enforcement and regarding the deficiencies in these laws that, in my opinion, are most deserving of the present attention of the Legislature, were sufficiently definite. I have no new suggestions to add to what I then said upon the subject.

The general character of the work performed by the Bureau during 1916 was very similar to that earlier reported for recent years. The classes of staple foodstuffs that exhibited most frequent departures from legal requirements have been those of local production and consumption. Food accessories, desert preparations, non-alcoholic drinks, and other manufactured food products of like character, are, of food products manufactured on a large scale made for other than purely local consumption, those which have exhibited the more frequent instances of nonconformity to the law.

It has been remarked in several of my reports for recent years that the examinations made of the principal classes of staple foods have shown relatively very little evidence of adulteration and misbranding. This condition is again shown by the work of this Bureau during the past twelve months.

ATTITUDE OF PRODUCERS AND DEALERS

America was settled by people who sought elbow room, and elbow room for the individual remains to this day an important part of the American ideal condition for happiness. We think that social condition the best, which affords the greatest freedom of opportunity for the individual; consequently, we are ever suspicious of legal proposals that tend to limit individual action, except with regard to those points of major importance for the preservation of community organization and good order. It has been difficult to make the readjustments which increase in population, more highly developed division of labor, the growth of our cities, and the improved means of transportation and communication have required for the welfare of our society as a whole. Every move that has looked to the curbing of the individual for the sake of society in general has been viewed with suspicion and opposed as a matter of course. The American citizen has in none of his life relationships shown more suspicion and opposition to welfare movements than in those which affected his business interests and activities.

It was, of course, admitted as an abstract proposition, that common honesty should exist between seller and buyer and between maker and user, yet there was an increasing tendency to regard business as a game governed by rules that were somewhat apart and different from those which admittedly should govern men in all other relations, unless it be those of love and war. This tendency to view business as a game was not without a good many compensating advantages. It probably increased the zest of business life and colored the daily business routine with some of the romance of adventure, but the general tendency was to make the customer appear more and more as a pawn upon the business chess board, an element necessary to business but requiring less and less of particular regard. The business competitors were the players who made the rules, and, so far as practicable, pawns were moved according to those rules. The pawns had nothing to do with making rules. Under such conditions, the existence of any ethics between the players and the pawns came to be more and more doubtful.

The time came when the pawns insisted upon helping to make the rules, and many of the players were much unsettled in mind because of this surprising attitude on the part of the pawns. There was vigous protest that anything of the kind outrageously violated the liberties of the players.

It may be safely assumed that groups of men engaged in various occupations, except those whose very nature panders to lax morality, are in general equal in honesty and in other moral qualities. It follows that the men who made and sold food products were on the average just as good as those who bought such products. There were a great many food makers and food merchants who could not bring themselves to regard business as a game in which the pawns had no say and were not entitled to consideration. Their common sense prevented their free acceptance of the game theory. Under the stress of competition and the general prevalence of rules established upon this theory, they did reluctantly a good many things which shadowed their happiness and peace of conscience. In fact, many of them were just as rebellious at the false conception of business ethics which the game theory developed as any consumer could be.

The rebellion of the consumer led, after years of public discussion, to the rejection of the theory that anything was fair in business on the part of the maker and seller, providing other makers and sellers agreed to do the same thing, whether it be to tell the same lie to the consumer or to cheat him in any other way, except possibly in making change, for, after all, there were some limits of decency beyond which makers and dealers couldn't go without losing caste among their fellows. The change, even though it required the organization and maintenance of public control to insure honesty of dealer toward consumer, brought, after its practicability had been shown, fully as much satisfaction to most of the makers and dealers as it did to the consumers. While most of them at first regarded our newer types of food laws, insurance laws and railroad laws as curious kinds of unpractical, theoretical proposals, they presently began to see that there was after all much that was practical and valuable in these proposals, and before long leading business men became as earnest in advocating legislation of the kind as were any of their consumers.

It is only fair to say that the improvement in business honesty and in solicitous care for the welfare of the consumer has been owing as much, if not more, to the earnest co-operation of the business men of such great organizations as the National Canners' Association, the Specialty Manufacturers' Association, and other like organizations, as it has been to the zeal and watchfulness of the executive officers charged with the enforcement of food and other similar control laws. In fact, these laws gave the honest business man a chance to be honest and still stay in business.

The facts stated in very general terms in the foregoing paragraphs carry an important suggestion concerning the policies that are likely to produce with the least expense and confusion the greatest measure of public good. In the heat of the strife that preceded the passage of the food laws and other laws of like character, it was a popular notion that the executive appointed to enforce these laws must be ever watchful, suspicious and aloof from all those over whom these laws required him to exercise supervision. It was just a reproduction of the old notion that a good birch in the hands of a stalwart man was not merely an instrument of punishment, but was the best means of education. Our educational ideas have changed, and while the birch is still kept somewhere about the schoolhouse, it is no longer regarded as the best means of education. The same broadening of judgment is taking place in the enforcement of control laws. By actual experience, it is found that educational and co-operative methods are more efficient in securing what the people want than is recourse to the methods of fine and imprisonment. Of course, there is sometimes need for the birch in the schoolhouse, and when used it ought to be employed with enough vigor to secure obedience to the law of the schoolhouse. The same thing is true with respect to the enforcement of business control laws, and when counsel, warning and consultation fail to protect the people, the more drastic methods authorized by law must be unflinchingly applied if the executive officer is to be true to his trust.

There is something, however, more important than obedience, for obedience is, after all, a negative sort of quality. Self regulation growing out of the spirit of service is its active counterpart, and it is a happy thing for the American business man that he is coming so rapidly to see that there is nothing more conducive to that vague condition we call "happiness" than the realization that we are doing our best in giving good service. We all want the dollar, of course, but how much better that dollar is when we feel to the very bottom of our hearts that we have earned it. The business man has come somehow to realize very distinctly that fact.

Thus it is happily true that the co-operative method is today an entirely practical method and is being used more and more extensively for the welfare of the average citizen. It is exceedingly gratifying to be able here to recognize and record this fortunate change of conditions.

JUDICIAL INTERPRETATION OF THE LAWS

Although the general food laws of the several states and of the National Government are very similar in form and expression and are, for the most part, expressed in clear and definite terms, the immense variety of materials and the variety of labeling methods and other conditions of sale have raised numerous questions requiring the judicial interpretation of these laws in their application to the various materials, labeling methods, etc. Most of the fundamental points giving rise to dispute have already been passed upon by the courts, but each year witnesses the issue of some judicial decisions of importance in the interpretation and application of these laws.

The Supreme Court of the United States has, during the past year, handed down three opinions of far reaching effect upon a number of points of much importance in the interpretation and application of these food laws. Of these opinions, we will first allude to that in the cases known as the Hutchinson Ice Cream Company, et al., plaintiffs in error, vs. The State of Iowa, and A. B. Crowl, plaintiff in error, vs. Commonwealth of Pennsylvania, which were argued together and made the subject of opinion delivered by Mr. Justice Brandeis. Because of their importance, the several judicial opinions in the Crowl case are given in full in the appendix, including the opinion of Judge Walling, the trial judge, that of Judge Henderson of the Superior Court of Pennsylvania in the hearing upon appeal, and finally, that of Mr. Justice Brandeis of the Supreme Court of the United States. The reader is referred to the appendix for the decisions upon the several points on which the respective courts ruled. We will simply note at this place the chief point. The plaintiffs in error urged that inasmuch as the products frequently sold under the name of "ice cream" were composed of various selections of ingredients employed in different proportions and sometimes without the inclusion of any milk product whatever, that ice cream should be regarded as a confection whose composition bears no relation to its name, and that consequently a legislative act which requires that this commodity should contain not less than a stated amount of butterfat is in excess of the Legislature's police power, that it constituted a prohibition of the sale of certain groups of products previously sold as ice cream and worked in effect a violation of the fourteenth amendment of the United States Constitution. The United States Supreme Court held that "the legislature may well have found in these facts (as to the sales of products previously sold under the single name 'ice cream') pursuasive evidence that the public welfare required the prohibition enacted. . . . Laws designed to prevent persons from being misled in respect to the weight, measurement, quality or ingredients of an article of general consumption are a common exercise of the police power. . . . This court has repeatedly sustained the validity of similar prohibitions." The court further held, with respect to products not conforming with the legal standards established for ice cream, that the acts did not prohibit their sale but merely prohibited their sale as ice cream, accepting as binding upon this point the construction given to the Iowa act by the Supreme Court of that state, and declining to assume that the Supreme Court of Pennsylvania, which did not specifically construe the Pennsylvania act with respect to this point, would have construed it otherwise.

This decision has a far-reaching application.

The second case to which we allude is that of W. T. Price, plaintiff in error, vs. People of the State of Illinois. This case arose from a conviction in the Municipal Court of Chicago on account of a sale in that city of a preservative compound known as "Mrs. Price's Canning Compound," alleged to be intended as a "preservative of food," and to be "unwholesome and injurious in that it contained boric acid." The Illinois Food Law of 1907 declares that an article shall be deemed to be adulterated: In case of food: . . . If it contains any added poisonous or other added deleterious ingredients which may render such article injurious to health, and declares that boric acid, among other substances specifically named, is unwholesome and injurious. The same act, section twenty-two, prohibits the sale, etc., of any mixture or compound intended for use as a preservative . . . in any food, but provides that this section shall not apply to pure salt added to butter and cheese. There was a stipulation of facts including the following points of interest under the Pennsylvania food law: That the compound contained boric acid; that it is not claimed to possess food value but is an antiseptic and may, among other uses, be employed to prevent canned fruits and vegetables from souring and spoiling, and that the declaration of these facts concerning its lack of nutritive quality, its being an antiseptic and the possible food preservative values of the preparation, were stated on a label printed on the small envelope in which the preparation was originally packed in the Minneapolis factory, where it was made and in which it was transported to Illinois and there sold. It was also stipulated that the fact that the material, without substantial difference in kind or proportion of ingredients, is an article of commerce, has for a period of years been sold under that distinctive name, is well known in a number of states of the Union as a distinctive article for use for canning by the housewife, and that it is not sold to manufacturers of food or canners of food for sale. In the Municipal Court trial, evidence offered by the defendant that there is no added ingredient of any kind whatever was rejected as not being addressed to the charge made; also, for other reasons, evidence that boric acid is not injurious to health and that the Price Canning Compound is not adulterated or misbranded in any way. The defense claimed that the statute was inapplicable to the case on trial, or, if applicable, was repugnant to the Constitution of the state, and to the commerce clause and the fourteenth amendment of the Federal Constitution. These claims were denied by the Municipal Court and the case taken upon appeal to the Supreme Court of Illinois. The State Supreme Court, construing this statute, held that section eight, dealing specifically with adulterated food, and section twenty-two, dealing specifically with the sale of preservatives, are parts of one act; that the effect of section eight, which specifically declares boric acid to be injurious and unwholesome, is therefore not limited to food containing that substance as an added ingredient, but applies also to food preservatives, although the latter may be specifically claimed not to have direct food value. As one ground for this construction, the State Supreme Court noted that preservatives containing unwholesome and injurious ingredients are fully as injurious if used by the housewife for food preservation as if they had been added by a manufacturer to such foods for placing on the market. The case was then taken on appeal of the State Supreme Court to the Supreme Court of the United States. The latter court declined to review the construction placed by the Illinois Supreme Court upon the Illinois food law of 1907, and accepted the construction of the State Supreme Court as to the meaning of the statute for determination of the validity of the act under the Federal Constitution. In brief, the opinion was that the legislative prohibition against the sale of food containing boric acid must be sustained as within its police powers, unless this prohibition is palpably unreasonable and arbitrary; that the statute, as applied, does not effect a deprivation of property without due process of law and a denial of the equal protection of the laws, contrary to the fourteenth amendment; that it is not enough that the conclusion of the Legislature in the matter of fact involved is debatable, as the Legislature is entitled to give effect of its own judgment, but that to set aside the legislative enactment here in question, it must be shown that boric acid must be beyond doubt classed as a wholesome article of commerce, so harmless in its designed use and so unrelated in any way to any possible danger to the public health that the enactment must be considered as a merely arbitrary interference with the property and liberty of the citizen. Further, the court notes that the judgment of the Illinois Legislature with respect to boric acid appears to have such support that it cannot be regarded as arbitrary. The court also held that it cannot be said that the Legislature exceeded the bounds of reasonable discrimination in classification when it enacted the prohibition in question relating to foods and compounds sold as food preservatives. The court therefore held that, with respect to these points relating to the fourteenth amendment of the Constitution, there was no ground to hold the statute to be repugnant to that amendment. Concerning the remaining contention by the plaintiff in error, that the article is not an adulterated food, and was not charged to be such, but was an article of commerce manufactured in another state; and that the state of Illinois could not prohibit its introduction and sale in the course of interstate commerce, the court held it unnecessary to deal with the question in the scope thus suggested, but that the sole ground for involving the commerce clause for escape from the restrictions of the State law is connected with the question whether the article was sold in an "original package" as that term has been construed by the Supreme Court. In the opinion delivered by Mr. Justice Hughes, the Supreme Court held that, although it was conceded that defendant's witness, if sworn, would testify that the compound mentioned "is an article of commerce sold in Illinois, in the original package manufactured and made in Minnesota," nothing more having been shown as to the nature of the package, this admission as to "original package" was properly regarded as referring simply to the small package in the envelope which the state had described in its evidence before the Municipal Court. There was nothing to show that, in commercial shipments into the state, the small package was segregated or separately introduced, and that presumption of such state of facts would not be justified. The court reaffirmed its frequent holding, to the effect that if these small packages were associated in their shipment into the State, and were subsequently sold separately or in various lots, these separate packages, although respectively in the original envelopes, would not be classed as "original package" within the rule invoked, so as to escape the local law governing domestic transactions. The courts therefore affirm the judgment of the Supreme Court of Illinois. The opinion in this case is presented in full in the appendix.

The third opinion was delivered by Mr. Justice Hughes on behalf of the Supreme Court of the United States in the case known as "The United States, plaintiff in error, vs. Forty Barrels and Twenty Kegs of Coca Cola. It includes a number of points of especial interest involving the interpretation of like clauses in the Pennsylvania Food Law. This opinion is not printed in the appendix, but was given in full in Circular No. 86, Office of the Solicitor, United States Department of Agriculture. The Pennsylvania Food Law of 1911 declares a food to be adulterated when it contains any added sulphurous acid, sulphur dioxide, boric acid, etc. The act also defines the term "food" to include, for the purposes of the act, all articles that enter as ingredients into the composition of food. The question has been raised under this act whether a material consisting of or containing boric acid as one of its chosen ingredients and sold under a non-declarative name for use in preserving food could be regarded as a food adulterated because it contained added boric acid. The Federal Food and Drugs Act declares that, in case of food, an article shall be deemed to be adulterated if it contains any added poisonous or other added deleterious ingredient which may render such article injurious to health. The question as to the meaning of the word "added" in the Federal Act was raised in the Coca Cola case. The opinion discusses at length the meaning which should be given to this word as it is used in the Federal Food Law, and its conclusion is stated as follows: "Congress, we think, referred to ingredients artificially introduced; these it described as 'added.'" Since the word "added" as used in the Pennsylvania Law has the same relation as shown for it in the Federal Law, it appears that if boric acid be a deliberately chosen material, whether it is sold alone under a non-descriptive name or in mixture with other substances for use as a food preservative, it should be regarded as "added" in the sense in which that term is used by the Pennsylvania Act. In the Coca Cola case, it was charged that the expression "Coca Cola" represented the presence in the product of the substances coca and cola and that it contained "no coca and little if any cola." The lower courts had held to the opinion that the name "Coca Cola" was to be regarded as a distinctive name, not necessarily a declaration of the composition of the article sold under it, but the Supreme Court held with respect to distinctive names: "A mixture or compound may have a name descriptive of its ingredients or an arbitrary name. The latter (if not already appropriated) being arbitrary, designates the particular product. Names, however, which are merely descriptive of ingredients are not primarily distinctive names save as they appropriately describe the compound with such ingredients. To call the compound by a name descriptive of ingredients which are not present is not to give it 'its own distinctive name'—which distinguishes it from other compounds—but to give it the name of a different compound. That, in our judgment, is not protected by the proviso, unless the name has achieved a secondary significance as descriptive of a product known to be destitute of the ingredients indicated by its primary meaning."

This opinion in its decision upon the two points above quoted has a far-reaching effect.

SUMMARY OF THE BUREAU'S ACTIVITIES DURING 1916

At this point will be presented a summary of the Bureau's operations during the past year. Matters of detail requiring special mention will be reserved for a later section of the report. During 1916, the chemists of the Department analyzed 5,807 samples of various food stuffs, and there were terminated 1,093 prosecutions for violations of the Food Laws. The several classes of materials on account of whose adulteration and misbranding these prosecutions were instituted, are as follows: milk, 341; coffee and chicory, 3; cold storage foods, 109; eggs, 20; foods, 240; fruit syrup, 1; ice cream, 12; lard, 18; non-alcoholic drinks, 222; oleomargarine, 97; renovated butter, 2; sausage, 10; vinegar, 18.

The continued vigilance of field agents and the growing use of oleomargarine have resulted in the collection, during the past year, of about $33,000.00 more from oleomargarine license fees than were collected in 1915, although that was a record year.

To afford an idea of the growth of the Bureau's work and of its cost to the people, the following comparative statement covering the years 1907 to 1916, has been prepared:

Year.	Samples Analyzed.	Cases Terminated.	Receipts.	Expenditures.
1907,	7,400	664	$55,732 63	$78,455 88
1908,	8,300	300	54,580 62	69,968 20
1909,	6,200	797	86,594 15	83,700 00
1910,	5,594	667	110,802 95	79,661 65
1911,	8,200	1,029	120,993 48	83,083 15
1912,	7,204	1,049	136,125 49	81,858 55
1913,	6,846	1,025	173,789 76	75,587 12
1914,	4,827	1,010	225,910 78	73,271 41
1915,	8,939	1,165	279,055 40	85,901 36
1916,	5,807	1,093	303,367 03	77,931 97
Totals,	69,317	8,799	$1,546,952 29	$789,419 29

This table shows that the receipts for the year 1916, which are deposited with the State Treasurer for the use of the Commonwealth, were $225,435.06 in excess of the expenditures, which are provided for by a special appropriation, and that for the entire period of ten years the total receipts were $757,533.00 in excess of the expenditures.

In addition to the work summarized in the foregoing table, there was issued in 1916 Bulletin No. 285 on the subject of flavoring extracts, written by Dr. C. H. LaWall of this Bureau and representing the systematic study of the flavoring extracts found on sale in the markets of the State. This survey, while it shows that the frauds of adulteration and misbranding practiced in the case of flavoring extracts have been very greatly reduced in proportion, they have not yet been wholly eliminated.

COMMENTS UPON ADULTERATIONS IN PARTICULAR CLASSES OF FOODS

The 5,807 food samples analyzed in 1916 represent the several groups of food products in the following proportions:

Butter,	328
Cheese,	1
Cream,	649
Milk,	2,938
Cold Storage Products,	120
Eggs,	206
Fruit Syrups,	7
Ice Creams,	150
Lard,	31
Non-Alcoholic Drinks,	382
Oleomargarine,	28
Renovated Butter,	1

Sausage,	41
Vinegar,	2
Other Food Products,	923
	5,807

A detailed statement concerning the subordinate kinds of foods examined is presented as Article I to the appendix of this report, and in Article II of the same appendix is presented the classified list of the cases terminated, including a statement of the kinds of food which were adulterated and misbranded and of the general nature of the several offenses. It is here noted, as in preceding reports, that the cases terminated do not correspond precisely with those whose analyses are here presented. This is due to the fact that in many cases there is necessarily a considerable interval of time between the report of the chemist and the final conclusion of the court proceedings; but for the purposes of a general comparison this difference may be overlooked.

OLEOMARGARINE AND RENOVATED BUTTER

The nature of the material sold under the name "Oleomargarine" and the conditions of sale have been the subject of continuous vigilance of the Bureau's agents. Instances of suspicious coloration have been very few. The total number of samples of oleomargarine and of suspected butter analyzed during 1916 were only twenty-eight. There were terminated ninety-seven cases for violation of the act, most of the cases coming over from 1915, in which coloration in violation of the act was alleged and established in sixty-nine cases; improper stamping in two cases; serving in restaurant without a license, one case; selling at retail without a license, twenty-five cases; selling at wholesale without a license, one case. Although but ninety-seven cases were involved, the several offenses were charged in each of a number of these cases, which accounts for the apparent excess in the number of offenses listed in the preceding sentence.

But one sample of renovated butter was presented for analysis during the past year, and two cases terminated because of failure to properly stamp the goods and for selling without a license. This article continues to be produced and sold in Pennsylvania in very small volume.

VINEGAR

In view of the very large number of examinations of market vinegars made during the preceding two or three years, attention was concentrated in 1916 upon other products and but few samples of vinegar were taken for examination. Eighteen cases were terminated in 1916 involving adulterations of this article. In the case of cider vinegar, there were five such cases; three involving added water, and two because of adulterations not specifically listed. Two samples consisting of acetic acid and water were sold as cider vinegar, and in another case distilled vinegar was sold under the name of the apple product. In another case, adulteration with glucose was found, and in three other cases, articles sold as fermented syrup vinegar were found to consist of distilled vinegar colored with caramel. Six cases affected distilled vinegar either with respect to low acidity or artificial coloration.

MILK

Of milk samples, there were analyzed twenty-eight hundred and ninety-three, and adulterations of this article were the basis of three hundred and forty-one cases, and two hundred and seventy-four cases terminated. In but three of these instances were the prosecutions based upon the presence of a preservative, formaldehyde. In one hundred and seventy-five cases, the samples analyzed were found to be below standard in either milk fat or solids, or both. Skimming was charged in forty-four cases, and watering in fifty-four. There was one case of adulteration found in the case of evaporated milk, three in the case of buttermilk and forty-one in the case of skimmed milk. Prosecutions with respect to skimmed milk were terminated in nine cases; five on account of watering, and four for the sale of skimmed milk for milk. Six hundred and forty-nine samples of cream were examined, and fifty-eight cases terminated because the article was found to have been below standard in butterfat.

The use of preservatives in milk happily continues to be very rare. The proportion of cases in which the evidence was sufficient to sustain charges of watering and skimming was much lower than in the corresponding exhibit for 1915. In 1915, out of each one hundred samples of milk sold, thirteen were found deficient in fat; in 1916, the proportion of fat deficiencies was only nine in each hundred.

BUTTER AND CHEESE

Three hundred and twenty-eight samples of butter and one sample of cheese were analyzed during the past year, but no cases appeared involving violation of the law. This was a repetition of the conditions obtaining in 1915.

ICE CREAM

One hundred and fifty samples of ice cream and water ice were analyzed, including, however, only five samples of the ices and one sample of so-called "milk balls." Twelve prosecutions under the Ice Cream Act were terminated in 1916, all because of deficiencies in the quantity of milk fat found. There continues to be a very marked improvement in fat richness of the articles sold in Pennsylvania under the name "ice cream."

SAUSAGES

Of these materials, forty-one were analyzed in 1916, and during that year, there were terminated ten cases: six brought because of the addition of cereals or vegetable flour, and four because of such additions together with added water. In the case of this class of foods also, the conditions as to adulteration with cereals and added water continue to exhibit a great improvement over those existing before the passage of the Sausage Act.

LARD

Thirty-one samples of lard were analyzed in 1916, and eighteen cases terminated. Of these, one was brought because the article was sold as fresh lard, whereas it was a compound lard not properly marked, while in seventeen cases, the articles proved to be imitation lard, consisting chiefly of cottonseed oil and stearin. In this, as in other classes of food supplies sold from groceries and meat shops, it must be constantly borne in mind that the proportion of cases instituted to the number of samples examined is much larger than the real proportion of adulteration in the total amount of these commodities sold in the markets. This is the result of the agents' practice of buying for analysis chiefly those articles which are for some reason suspected.

EGGS

Of eggs other than those found in cold storage, there were examined in 1916, two hundred and six samples, of which one hundred and seventy-seven were fresh in the shell. The other samples included eggs opened, in the shell, frozen eggs, and desiccated eggs. There were terminated, during the year, twenty cases for violation of the Egg Act of 1909: three because stale eggs were sold as fresh, fourteen because they were unfit for food purposes and not properly denatured, and three additional cases of these same kind where the eggs had been sold for bakers' use.

COFFEE

Three cases were terminated under the Coffee and Chicory Act of 1915 because of the sale of the articles as coffee, whereas they consisted of compounds containing cereals.

NON-ALCOHOLIC DRINKS

Non-alcoholic drinks were effectively sampled and analyzed, the chemists having reported on three hundred and eighty-two such samples. There were terminated two hundred and twenty-two cases because of violations of the Non-Alcoholic Drinks Act of 1909. Four of these cases were brought because of the presence, in excessive amounts, of alcohol; eighteen because saccharin was present. Most of the remaining cases were brought because the articles were sold under names indicating normal products, whereas, in fact, they were imitations. This survey of conditions in respect to non-alcoholic drinks indicates a continued improvement with respect to the use of saccharin, but a very large proportion of fraud is, the sale of imitation products under the names of the corresponding normals.

ARTICLES SUBJECT TO THE GENERAL FOOD LAW OF MAY 13, 1909

Of these groups of food materials, nine hundred and twenty-three were examined, a number substantially equal to those articles of like character examined in 1915, and during the year, two hundred and forty cases brought because of violations of this act, were terminated. Of special interest with respect to these cases may be noted the fact that the ground of prosecution was the presence of sulphur dioxide in two cases of dried apricots, twenty cases of cherries sold in jars and twelve of so-called Maraschino cherries, three lots of dried figs, six samples of dried peaches, a sample of prunes and two of raisins. Because of the presence of benzoate of soda, either undeclared or in amounts beyond the legal tolerance, cases were brought in six cases of codfish and two of tomato ketchup. Because of the presence of boric acid, cases were brought affecting a canning compound and two lots of dried fish, while the presence of added nitrous acid led to two prosecutions affecting flour. This condition with respect to the use of the prohibited preservatives is comparatively excellent in contrast with the conditions existing before the passage of food laws. Cases due to decomposition and unfitness in other respects for food use involved forty-nine cases, relating to meats, eggs, nuts, cereals, sauerkraut, etc. It cannot be expected that the market will ever be entirely free from products that have undergone decomposition during their holding for sale. Only the greatest vigilance can keep the proportion of such decomposed food materials down to a low figure. Unfortunately, the language of the food law limits the method which the Food Commissioner may use to discover such materials. Of the remaining cases, many were brought because of misbranding or because they were deficient in some valuable material; or, because they had been diluted with some other substance, particularly water. Of the latter class were three samples of butter containing excessive water, and fifty-six samples of watered oysters.

COLD STORAGE FOODS AND COLD STORAGE WAREHOUSES

The Bureau has steadily maintained the examination of cold storage warehouses with respect to their having taken out the requisite license, maintained suitable sanitary conditions, and observed the legal requirements, with respect to markings, specified in the law.

One hundred and twenty samples of various stored meats, poultry, fish, butter and eggs were examined by the chemists. During 1916, there were terminated one hundred and nine cases under the provisions of this act: four because of the storage of foods beyond the legally specified limits; eighty-seven because of failure to stamp as required by law; one for re-entry in cold storage after withdrawal for sale; seventeen because cold storage foods had been offered for sale as fresh foods. As a result of the year's examinations, it is believed that the conditions of sanitation and soundness of the cold storage foods held in the State may properly be regarded as excellent. It is more difficult to determine the completeness with which the law is obeyed as to the marking of cold storage foods in the hands of the retailer.

The following table shows the quantities of the several more important groups of food in cold storage at the end of the several quarters of 1916. In view of the existing conditions of demand and supply for cold storage foods, it is interesting to compare the amounts held in storage during corresponding quarters of the years 1915 and 1916. The comparisons will be chiefly confined to the quarters ending March 31st and December 31st, and to the products commonly stored in greater quantity. Of beef, in whole carcasses, there was stored on March 31, 1915, eight hundred and eighty-three thousand six hundred and twenty-three pounds, and on March 31, 1916, three hundred and fourteen thousand three hundred and three pounds; and on December 31, 1915, five hundred and eighty-eight thousand six hundred and eighty-five pounds, and on the same date in 1916, six hundred and twelve thousand, six hundred and seven pounds. That is, the spring storage of beef and whole carcasses was much less in 1916 than in the same month in the preceding year, but there was no great difference in the amounts of beef carcasses in storage at the end of the last quarter of the two years. Of beef not classified, parts of carcasses, there was stored on March 31, 1915, about one million and a half pounds; on March 31, 1916, a little over seven hundred thousand pounds. Of hogs' carcasses, the amount stored on March 31, 1916, was a little over two-fifths of the amount found at the corresponding date in 1915, and on December 31st, the amount was only one-half of that found in 1915. Of hogs stored, not classified parts of carcasses, the amount at the end of March, 1916, was about three-fourths of the amount found March 31, 1915, but on December 31, 1916, the amount was found a little greater than that found on the same date in 1915. With respect to fish, the amount found at the end of March, 1916, was two and a half times as much as was found at the same time in 1915, while the amount found in December 31, 1916, was but three-fourths of that found at the same time in the preceding year. Of domestic poultry, the amount at the end of March of the past year was about two-thirds as much as for the same date in 1915, but the amount found at the end of December 31, 1916, was nearly twice as great as that found in 1915. For eggs, we will compare the amounts held at the end of June in each year, confining attention to eggs in shell. In 1915, there were eighteen million eight hundred thousand one hundred and sixty-nine dozen of eggs in storage on June 30; in 1916, about fifteen million five hundred thousand. In the case of butter, the quantity in storage ending September 30th will be used for comparison. At that date in 1915, there were in storage about nine million seven hundred and fifty thousand pounds, and in 1916 about nine million five hundred thousand pounds. While these comparisons are of much interest, it is difficult to deduce from them any very exact notion of the total amount of cold storage foods held in Pennsylvania cold storage warehouses through the entire year. Some of these quarterly accounts undoubtedly represent identical packages, wherein in other cases doubtless large amounts of foods have entered the warehouses and been withdrawn within the period of the quarter. To offer some notion of the relative magnitude of this business and of the exceedingly valuable service rendered by cold storage warehousemen to the food consuming public, there cannot be too much emphasis placed upon the fact that the development of this business has been a great boon to the food consumer and that all that needs to be condemned with respect to its conduct, as far as the Pure Food Laws are concerned, are occasional instances of unsanitary condition, rare instances of storage for excessive periods, and failure to make known to the buying public that the foods are cold storage foods. Emphasis should be placed upon the last point, not because cold storage foods are themselves unfit for use, but only because they deteriorate more rapidly after withdrawal from storage than is the case with fresh foods, and so need to be handled with especial care and consumed promptly after their removal from the cold air of the warehouse.

ACKNOWLEDGMENTS.

It is again my privilege to express my appreciation of the hearty support rendered to me by my office force, special agents, counsel and food experts. I am under special obligation also to the Attorney General's Office, more especially to Deputy Attorney General William M. Hargest, to whom is committed the care of the legal phases of the work of this Bureau.

My acknowledgments are due also to Governor Brumbaugh and to yourself, for continued encouragement and support in the work assigned to me.

Yours very respectfully,

JAMES FOUST,
Dairy and Food Commissioner.

APPENDIX

ARTICLE I.

SUMMARY.

I. A List of Articles Analyzed by Chemists of this Bureau During the Year 1916.

Article.	Number Analyzed.
COLD STORAGE PRODUCTS:	
Beef,	1
Beef kidneys,	3
Butter,	4
Chicken,	1
Eggs,	83
Fish,	5
Fish, Butter,	3
Fish, Mackerel,	1
Fish, Perch,	1
Fish, Sea Bass,	1
Fish, Smelts,	12
Sweet breads,	1
Turkey,	4
	120
DAIRY PRODUCTS:	
Butter,	328
Cheese,	1
Cream,	649
Milk, butter,	3
Milk, evaporated,	1
Milk, skimmed,	41
Milk,	2,893
	3,916
EGGS:	
Desiccated eggs,	6
Dried egg content,	2
Fresh, in shell,	177
Frozen,	6
Frozen egg content,	6
Liquid egg content,	3
Opened,	6
	206
FRUIT SYRUPS:	
Cherry,	1
Grape,	1
Lemon,	1
Orange,	2
Raspberry,	1
Vanilla,	1
	7
ICE CREAMS AND WATER ICES:	
Chocolate,	3
Maple,	1
Ice cream (no flavor given),	4
Strawberry,	3
Vanilla,	133
Lemon water ice,	4
Milk balls,	1
Strawberry ice,	1
	150
LARD,	31

SUMMARY—Continued

Article.	Number Analysed.
NON-ALCOHOLIC DRINKS:	
Ale, Ginger,	11
Ale, Scotch Hop,	1
"Apella",	1
"Beverage",	1
Birch Beer,	5
Bis Mac,	1
Bludwine,	1
Champagne Fizz,	1
"Cherry",	2
Cherry Cheer,	3
Cider, Apple Compound,	2
Cider, Orange,	2
Cider, Sweet,	16
"Gay Ola",	1
Grape juice,	1
"Ironbeer",	1
Jamaica Ginger,	1
Lemonade,	5
Lemon Sour,	2
Malt Mead,	1
Orangeade,	9
Orange Beverage,	1
Orange Julep,	3
"Oxo",	1
"Parfay",	1
Penn-Cola,	1
Phosphate, Cherry,	1
Pop, Birch,	1
Pop, Cherry,	6
Pop, Cider,	1
Pop, Grape,	4
Pop, Lemon,	6
Pop, Orange,	1
Pop, Peach,	3
Pop, Raspberry,	30
Pop, Strawberry,	115
Punch, Grape,	1
"Raspberry",	1
Sarsaparilla,	3
Smash, Cherry,	9
Smash, Grape,	5
Soda, Cherry,	14
Soda, Cream,	3
Soda, Lemon,	12
Soda, (no flavor given),	1
Soda, Orange,	13
Soda, Peach,	1
Soda, Pear,	1
Soda, Raspberry,	26
Soda, Strawberry,	29
Soda, Vanilla,	9
"Sparkade",	1
"Strawberry",	4
Summer Drink, (strawberry flavor),	1
Temperance Beer,	1
Tokay Crush,	1
"Wy-ne",	1
Wyo-Cola,	1
Zizz,	1
	382
OLEOMARGARINE,	28
RENOVATED BUTTER,	1
SAUSAGE:	
Sausage, Bologna,	7
Sausage, Fresh Pork,	18
Sausage, Frankfurters,	5
Sausage, Polish,	2
Sausage, Pork and Beef,	1
Sausage meat,	2
Sausage, Vienna,	5
Sausage, Wieners,	1
	41

SUMMARY—Continued

Article.	Number Analyzed.
VINEGAR:	
Vinegar, Cider,	2
	2
FOOD PRODUCTS.	
CAKES AND PUDDINGS:	
Cake, Almond,	1
Cake, Cup,	1
Cake, Currant,	1
Cake, Drop,	1
Cake, Lady Fingers,	1
Cake, Mity-Nice,	1
Cake, (no name given),	2
Cake, Pound,	1
Cake, Sponge,	1
Cake, Tasty,	1
Gelatin,	1
Jello (cherry flavor),	1
Puddine,	1
Rolls,	1
CANNED FRUITS AND VEGETABLES:	
Cherries,	51
Cherries, Maraschino,	46
Mushrooms,	1
Peaches,	1
Peas,	1
Sauer Kraut,	6
Tomatoes,	2
DRIED FRUITS:	
Apricots,	2
Dates,	1
Figs,	2
Peaches,	3
Prunes,	2
Raisins,	10
CONFECTIONERY:	
Brown candy babies,	1
Candy,	2
Candy baskets,	1
Candy nougats,	1
Caramels,	1
Chocolate candy animals,	2
Chocolate candy babies,	1
Chocolate candy cigarettes,	1
Chocolate creams,	4
Cocoanut creams, chocolate coated,	1
Cream candy dolls,	1
Fudge, chocolate,	5
Glace fruit,	5
Glace nuts,	1
Grab Bag candy,	1
Licorice sticks,	1
Lolly Pops,	1
Marshmallows,	11
Peanut candy,	1
Prize Bag candy,	1
Walnut candy tarts,	1
FLAVORING EXTRACTS AND ESSENCES:	
Almond, Essence of,	1
Almond, Extract of,	7
Almond flavoring,	1
Birch-Wintergreen flavoring,	1
Celery, Extract of,	1
Jamaica Ginger, Essence of,	1
Lemon, Essence of,	2
Lemon, Extract of,	[illegible]

SUMMARY—Continued

Article.	Number Analyzed.
FOOD PRODUCTS—Continued.	
FLAVORING EXTRACTS AND ESSENCES—Continued.	
Lemon flavoring,	1
Lemon, imitation,	2
Lemon substitute,	1
Lemon and Citral Compound flavoring,	1
Orange, Essence of,	1
Orange, Extract of,	7
Orange flavoring,	2
Pineapple, Extract of,	1
Raspberry, Extract of,	4
Vanilla, Compound of,	3
Vanilla, Essence of,	2
Vanilla, Extract of,	93
Vanilla flavoring,	6
Vanilla, imitation,	2
Vanilla substitute,	5
Vanilla and Tonka Compound, Extract of,	1
Vanilla, Vanillin and Coumarin flavoring,	1
Vanillin, Extract of,	2
Vanillin and Coumarin, Extract of,	1
Vanillin and Coumarin flavoring,	1
Vanillin and Coumarin Substitute,	1
Wintergreen, Essence of,	2
Wintergreen, Extract of,	5
FLOUR:	
Flour, Buckwheat,	5
Flour, Rye,	1
Flour, Wheat,	169
FRUIT BUTTERS, JAMS, JELLIES AND PRESERVES:	
Butter, Peanut,	1
Jam, Gooseberry	1
Jam, Plum-Apple Compound,	1
Jam, Raspberry-Currant,	1
Jelly, Apple,	2
Jelly, Currant,	1
Jelly, Grape,	2
Preserves, Blackberry,	2
Preserves, Peach	1
Preserves, Pineapple,	1
Preserves, Strawberry,	2
KETCHUPS, OILS, PICKLES, ETC.:	
Conserve, Tomato,	1
Horseradish,	11
Ketchups,	21
Oil, Olive,	6
Oil, Salad,	2
Olives,	1
Relish,	1
Sauce, Tomato,	3
Pickles, Sweet,	1
Pickles, Sweet Mixed,	4
Pickles, Sweet Spiced,	1
FISH, CANNED, DRIED AND FRESH:	
Codfish,	20
Codfish, boneless,	1
Codfish, dried,	10
Codfish, flaked,	1
Codfish, salted,	1
Codfish, shredded,	3
Codfish, threaded,	4
Eels, fresh,	1
Fish, dried,	2
Fish, flaked,	2
Fish, fresh,	7
Fish, middles,	1
Mackerel, fresh,	1
Oysters, fresh,	101
Sardines, canned,	1
Shrimps, canned,	3

SUMMARY—Continued

Article.	Number Analyzed.
FOOD PRODUCTS—Continued.	
MEATS, CANNED AND FRESH:	
Bacon, Breakfast,	1
Beef kidneys,	1
Goat meat,	16
Ham,	6
Ham, Deviled,	1
Ham, Minced,	1
Lamb,	2
Liver Pudding,	2
Meat, Ground,	2
Meat, Potted,	1
Muskrats,	1
Mutton,	1
Neck Bone, with meat,	1
Opossums,	2
Pork and Beans, canned,	1
Rabbits,	1
Steak, Beef,	1
Steak, Hamburg,	20
Steak, Sirloin,	1
Steak, Tenderloin,	1
NUTS:	
Chestnuts,	1
Peanuts, Roasted,	5
Peanuts, Salted,	1
Pecan nut meats,	2
Walnuts, Black,	1
Walnut, Black, meats,	2
Walnuts, English,	2
Walnut, English, meats,	2
MISCELLANEOUS:	
Baking Powder,	1
"Beer",	1
Blackberries,	1
Breakfast Food, (Uncle Sam's),	3
Canning Compound,	1
Cocoa,	1
Coffee, ground,	2
Confectioners' glaze,	1
Crackers, Lunch,	1
Cream Thickening,	1
Grenadine Syrup,	1
Grapes,	1
Gum Tragacanth (whole),	1
Honey,	3
Lentils,	1
Macaroni,	1
Mapleine,	1
Mustard, prepared,	2
Noodles,	3
Peaches,	1
Peach Sauce,	1
Pepper, Black,	1
Potatoes,	2
Raspberries,	1
Roman Meal,	1
"Sago",	1
Scrapple,	2
Spaghetti,	1
Sugar, Granulated,	1
Sugar Wafers,	1
Sweet Breads,	1
Tomato Paste,	1
Tomato Stock,	1
Yeast, Magic, (dried),	1
	923

SUMMARY—Continued

Article.	Number Analyzed.
RECAPITULATION.	
Butter,	328
Cheese,	1
Cream,	649
Milk,	2,932
Cold Storage Products,	120
Eggs,	206
Fruit Syrups,	7
Ice Creams,	150
Lard,	21
Non-Alcoholic Drinks,	282
Oleomargarine,	28
Renovated Butter,	1
Sausage,	41
Vinegar,	2
Food Products,	923
	5,807

ARTICLE II.

CASES TERMINATED

THE FOLLOWING TABLE GIVES A LIST OF ARTICLES ANALYZED BY CHEMISTS AND FOUND TO BE IN VIOLATION OF THE FOOD LAWS, AND THE NUMBER OF SAMPLES OF EACH PRODUCT ON WHICH PROSECUTIONS WERE BASED AND TERMINATED.

COFFEE AND CHICORY ACT, 1915, IN VIOLATION OF—

Compound Coffee, containing cereals,	1
O-So-Good Blend Coffee, containing cereals,	2
	3

COLD STORAGE ACT, 1913, IN VIOLATION OF—

Cold Storage Beef, stored beyond the legal limit,	2
kidneys, stored beyond the legal limit,	1
Cold Storage Butter, not properly marked,	3
Cold Storage Eggs, sold as and for fresh eggs,	15
not properly marked,	57
Cold Storage Fish, not stamped as required by law,	12
Cold Storage Pigs's Ears, not stamped as required by law,	1
Cold Storage Pork, re-entered in cold storage after having been withdrawn,	1
shoulders, not properly marked and sold as fresh,	1
Cold Storage Sausage, not properly marked and sold as fresh,	1
Cold Storage Smelts, not stamped as required by law,	13
Cold Storage Sweet Breads, stored beyond the legal limit,	1
Cold Storage Turkey, not stamped as required by law,	1
	109

EGG ACT, 1909, IN VIOLATION OF—

Eggs, decomposed, not properly denatured and broken,	3
stale eggs sold as fresh,	3
in shell, unfit for food purposes,	10
opened, unfit for food purposes, and not denatured,	1
unfit for food purposes, to be used in bakery,	3
	20

FOOD ACT, 1909, IN VIOLATION OF—

Apricots, dried, contained sulphur dioxide,	2
Bacon, unfit for food purposes,	1
Blackberries and Raspberries, unfit for food purposes,	1
Butter, contained excessive water,	3
Cakes, currant, colored with coal tar dye,	1
Canning compound, made entirely of boric acid,	1
Candy, coated with shellac,	3
coated with resinous glaze,	4
dirty and filthy, unfit for food,	4
imitation, for pure candy, chocolate,	1

CASES TERMINATED—Continued

FOOD ACT, 1909, IN VIOLATION OF—Continued.

Cherries, canned, contained sulphur dioxide,	26
Maraschino, contained sulphur dioxide,	12
Chestnuts, unfit for food purposes,	1
Chicken, unfit for food purposes,	1
Coffee, contained chicory,	1
compound, misbranded,	1
Crackers, milk, unfit for food purposes,	1
Eggs, stale eggs sold for fresh,	10
unfit for food purposes,	9
Egg Noodles, artificially colored in imitation of eggs,	3
Extracts, lemon, contained wood alcohol,	1
misbranded,	3
orange, deficient in oil, and artificially colored,	1
misbranded,	1
vanilla, low in vanilla resins,	1
misbranded,	6
Figs, dried, contained added sulphur dioxide,	3
dried, unfit for food purposes,	1
Fish, cod, contained an excessive amount of sodium benzoate,	6
dried, contained boric acid,	2
fresh, unfit for food purposes,	1
shad, unfit for food purposes,	1
sardines, misbranded,	1
unfit for food purposes,	1
Flour, contained added nitrous acid,	2
Glace Fruit, contained sulphur dioxide,	7
Goat Meat, sold as and for mutton,	10
unfit for food purposes and sold for mutton,	2
Ham, unfit for food purposes,	2
Hamburg Steak, unfit for food purposes,	2
Macaroni, artificially colored with coal tar dye,	1
Mace, contained Bombay Mace,	1
Meat, Capicola Meat, unfit for food purposes,	1
unfit for food purposes,	8
Milk, low in fat,	1
skimmed,	1
Oleomargarine, colored sold for butter,	1
Olive Oil, adulterated with cotton seed oil,	2
Opossum, unfit for food purposes,	1
Oysters, contained added water,	56
Peaches, contained undeclared sulphur dioxide,	6
unfit for food purposes,	2
Pickles, sweet, contained excessive amount of benzoate soda,	2
Potatoes, unfit for food purposes,	2
Prunes, dried, contained undeclared sulphur dioxide,	1
Raisins, dried, contained undeclared sulphur dioxide,	2
Sago, unfit for food purposes,	1
Salad-oil, contained mineral-oil,	1
Sauer-Kraut, unfit for food purposes,	1
Strawberry-ice, artificially flavored and colored,	1
Syrup, Grenadine, colored with coal tar dye,	1

CASES TERMINATED—Continued

FOOD ACT, 1909, IN VIOLATION OF—Continued.

Tomato, catsup, contained excessive amount of benzoate of soda,	2
misbranded,	2
unfit for food purposes,	4
conserves, adulterated,	1
paste, unfit for food purposes,	3
stock, unfit for food purposes,	1
Violation of the Food Act,	3
Walnuts, English, unfit for food purposes,	1
Yeast, Magic, unfit for food purposes,	1
	240

FRUIT SYRUP ACT, 1905, IN VIOLATION OF—

Syrup, orange, colored with coal tar dye,	1
	1

ICE CREAM ACT, 1909, IN VIOLATION OF—

Ice Cream, Chocolate, below the standard in fat,	1
Vanilla, below the standard in fat,	11
	12

LARD ACT, 1909, IN VIOLATION OF—

Lard, compound, not properly marked, sold as fresh lard,	1
Imitation lard, contained cottonseed oil and stearin,	17
	18

MILK ACT, 1911, IN VIOLATION OF—

Cream, low in butter fat,	58
Milk, containing formaldehyde,	3
low in butter fat,	13
low in butter fat and solids,	158
low in butter fat and solids, partially skimmed,	4
low in butter fat and solids, skimmed,	39
low in butter fat and solids, skimmed and watered,	1
low in butter fat and solids, watered,	30
low in solids,	3
low in solids, watered,	9
watered,	14
Skimmed milk, for fresh,	4
watered,	5
	341

NON-ALCOHOLIC DRINK ACT, 1909, IN VIOLATION OF—

"Beverage," an alcoholic drink sold for a non-alcoholic beverage,	1
Cherry Cheer, artificially colored and flavored, contained no cherry,	2
misbranded,	1
Cherry Phosphate, artificially colored and flavored, sweetened with saccharin,	1
Cherry Smash, misbranded; artificially colored and flavored, contained no cherry,	4
Cider, Apple compound, contained an excessive amount of alcohol,	1
Cherry-Apple compound, contained an excessive amount of alcohol,	1

CASES TERMINATED—Continued

NON-ALCOHOLIC DRINK ACT, 1909, IN VIOLATION OF—Continued.

Orange, misbranded; artificially colored and flavored, contained no orange,	2
Sweet, contained added water,	1
Ginger Ale, artificially colored and flavored, sweetened with saccharin,..	1
Grape Smash, artificially colored and flavored, contained no grape juice,	2
Iron Beer, contained no iron, misbranded,	1
Jamaica Ginger, deficient in ginger,	1
Orangeade, artificially colored,	1
contained saccharin,	1
misbranded, artificially colored and flavored, contained no orange juice,	6
Orange Beverage, misbranded,	1
Pop, Cherry, artificially colored and flavored, misbranded,	6
Grape, misbranded; artificially colored and flavored, contained no grape juice,	2
Peach, misbranded; artificially colored and flavored, contained no peach juice,	2
Raspberry, misbranded; artificially colored and flavored, contained no raspberry,	10
Strawberry, misbranded,	20
misbranded; artificially colored and flavored; contained no strawberry,	61
Root Beer, artificially colored,	1
contained saccharin,	4
Soda, Cherry, misbranded, artificially colored and flavored, contained no cherry,	6
Chocolate, misbranded, artifically colored and flavored, contained no chocolate,	2
Grape, misbranded, artificially colored and flavored, contained no grape,	1
Lemon, contained saccharin,	2
misbranded,	5
misbranded, artificially colored and flavored, contained no lemon,	4
Orange, misbranded,	5
misbranded, artificially colored,	2
misbranded, artificially colored and flavored, contained no orange,	3
Peach, misbranded, contained no peach,	2
Pear, misbranded, artificially colored and flavored, contained no pear,	1
Pineapple, misbranded, artificially colored and flavored, contained no pineapple,	1
contained saccharin,	1
Soda, Raspberry, artificially colored,	1
contained saccharin,	1
misbranded,	2
misbranded; artificially colored and flavored, contained no raspberry,	8
misbranded; artificially colored and flavored, contained no raspberry; sweetened with saccharin, ...	4

CASES TERMINATED—Continued

NON-ALCOHOLIC DRINK ACT, 1909, IN VIOLATION OF—Continued.

Strawberry, artificially colored,	1
artificially colored and flavored, contained no strawberry,	14
contained saccharin,	3
misbranded,	3
misbranded, artificially colored and flavored, contained no strawberry,	12
Vanilla, flavored with coumarin in imitation of vanilla,	1
Wild Cherry, misbranded, artificially colored and flavored, contained no wild cherry juice,	2
Zizz, an intoxicating drink sold for a non-alcoholic beverage,	1
	222

OLEOMARGARINE ACT, 1901, IN VIOLATION OF—

Oleomargarine, colored,	29
colored, served with meal,	15
colored, served with meal, no license,	4
colored, sold as and for butter,	5
colored, sold as and for butter, no license,	8
colored, sold without a license,	8
not properly stamped,	1
not properly stamped, sold for butter,	1
served in restaurant, no license,	1
sold at wholesale without a license,	1
sold at retail without a license,	24
	97

RENOVATED BUTTER ACT, 1901, IN VIOLATION OF—

Renovated Butter, not properly stamped; sold without a license,	2
	2

SAUSAGE ACT, 1901, IN VOLATION OF—

Sausage, Bologna, containing cereals,	4
containing cereals and added water,	2
Potato Bologna, containing comminuted potato and added water,	1
Vienna Style, containing vegetable flour,	2
containing vegetable flour and added water,	1
	10

VINEGAR ACT, 1901, IN VIOLATION OF—

Vinegar, adulterated with glucose,	1
cider, adulterated,	2
contained added water,	3
consisting of acetic acid and water,	2
consisting of distilled vinegar, colored,	1
Distilled, below the legal standard for acidity,	2
below the legal standard for acidity and colored with caramel,	2
Distilled, compound, colored with caramel,	1
consisting entirely of white wine vinegar,	1

CASES TERMINATED—Continued

VINEGAR ACT, 1901, IN VIOLATION OF—Continued.	
Fermented Syrup, consisting of distilled vinegar colored with caramel,	3
	18
Total number of cases terminated,	1,093

ARTICLE III.

QUANTITIES OF FOODS IN PENNSYLVANIA COLD STORAGE WAREHOUSES

Foods.	Units of Quantity.	1916, March 31.	1916, June 30.	1916, Sept. 30.	1916, Dec. 31.
Meats:					
Whole carcasses:					
Beef,	Lbs.	314,303	73,611	64,953	612,607
Veal,	Lbs.	45,544	4,025	34,448	42,046
Lamb and Mutton,	Lbs.	76,560	37,978	167,823	364,646
Hogs,	Lbs.	198,563	188,143	119,845	122,570
Parts of carcasses, classified:					
Beef,	Lbs.	697,443	743,315	1,111,277	1,748,988
Veal,	Lbs.	12,390	28,751	60,822	82,164
Lamb and Mutton,	Lbs.	75,177	78,972	39,486	101,258
Pork,	Lbs.	909,294	1,277,827	574,676	866,642
Parts of carcasses, not classified:	Lbs.	3,390	19,782	....	10,864
Game,	Lbs.	3,204	3,096	2,757	46,384
Fish,	Lbs.	1,037,185	2,798,612	3,246,863	3,126,785
Domestic poultry,	Lbs.	2,365,351	1,495,279	1,931,423	4,135,311
Eggs:					
In shell,	Doz.	348,282	15,475,440½	12,220,857	2,175,992
Broken,	Lbs.	167,490	269,545	586,716	382,849
Butter,	Lbs.	445,465	5.166.329	9,555,966	5,069,830

ARTICLE IV.

RECEIPTS OF THE DAIRY AND FOOD BUREAU FOR THE YEAR OF 1916.

Cold Storage Licenses,	$3,550 00
Cold Storage Fines,	840 50
Egg Fines,	1,528 50
Food Fines,	8,185 01
Ice Cream Fines,	200 00
Lard Fines,	560 50
Milk Fines, 1901,	150 00
Milk Fines, 1911,	6,317 91
Non-Alcoholic Drink Fines,	4,509 38
Oleomargarine Licenses,	274,614 64
Oleomargarine Fines,	1,227 25
Renovated Butter Licenses,	933 34
Renovated Butter Fines,	100 00
Sausage Fines,	500 00
Vinegar Fines,	150 00
	$303,367 03

ARTICLE V.

AMOUNTS EXPENDED FROM THE APPROPRIATION FOR THE MAINTENANCE OF THE WORK OF THE DAIRY AND FOOD BUREAU OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE FOR THE YEAR 1916

Dairy and Food Commissioner's Salary,	$3,999 84
Salary of Clerk, Dairy and Food Bureau,	1,500 00
Messenger's Salary, Dairy and Food Bureau,	900 00
Chemists' Services and Expenses,	14,483 21
Clerical and Stenographers,	7,800 00
Special Agents' Salaries,	20,587 50
Attorneys, Assistants and Special,	6,542 14
Traveling and Agents' Expenses,	12,604 54
Enforcing Cold Storage Law,	9,514 74
Total expenditures for the year,	$77,931 97

ARTICLE VI.

OPINION

COMMONWEALTH vs. A. B. CROWL.	In the Court of Quarter Sessions of the Peace for the County of Erie, Pennsylvania. No. 32 September Session, 1911. Rule for a new trial and in arrest of judgment.

Defendant was indicted and convicted for selling ice cream deficient in butter fat, under the Act of March 24, 1909, P. L. 63; Sections 4 and 6 of said Act being as follows:

Section 4. "No ice cream shall be sold within the State containing less than eight (8) per centum butter fat, except where fruit or nuts are used for the purpose of flavoring, when it shall not contain less than six (6) per centum of butter fat."

Section 6. "Any person, firm, or corporate body who shall violate any of the provisions of this Act shall be guilty of a misdemeanor, and, upon conviction thereof, shall be sentenced to pay a fine of not less than twenty-five (25) dollars, nor more than fifty (50) dollars."

It is earnestly urged for defendant that said Act was repealed by the later Act of May 13, 1909, P. L. 520. "Relating to food, etc."

But there is nothing in the later Act fixing a standard of butter fat for ice cream or that in any manner conflicts with or supercedes the above quoted 4th section of the earlier Act. It is not necessary here to decide whether or not some of the other provisions of the earlier act are abrogated by the later. We are clearly satisfied that so far as relate to the provisions involved in this case there was no repeal.

Implied repeal is not favored; and in our opinion those two statutes are in *pari materia,* and as far as practicable should be construed together.

The said ice cream act is in line with other recent pure food legislation, is intended to protect the public from deception and from imposition, and is in our opinion valid and a proper exercise of the police power of the Commonwealth. It is less drastic than the Oleomargarine Act of May 21, 1885, P. L. 22, and that was sustained both by our Supreme Court and by the Supreme Court of the United States.

Powell vs. Commonwealth, 114 Pa. 265.

Powell vs. Pennsylvania, 127 U. S. 678.

And it is not as drastic as the Act of June 8, 1911, P. L. 712, "Relating to Milk." Within reasonable bounds it is for the Legislature and not for the courts to say what per cent. of butter fat ice cream must contain. It is a well known article of food, and the manifest meaning of the statute is that when sold it must contain the per cent. of butter fat stated in the Act. In regulating the sale of food the Legislature is not limited to the question of public health. Commonwealth vs. Kevin, 202 Pa. 23. Such legislation is beneficial to the public and should not be construed so strictly as to defeat the plain legislative intent. In the above cited case of Commonwealth vs. Kevin, 202 Pa., on page 27, the Supreme Court says:

"The object of the statute is to protect the public health by securing pure food and to prevent fraud and deception in the manufacture and sale of adulterated articles of food. The purpose of the Legislature in the passage of the Act is most commendable and the statute should receive a construction by the courts that will fully and effectively accomplish the object of its enactment." See also Stull vs. Reber, 215 Pa. 156; Commonwealth vs. Shoben, 215 Pa. 595; Bechtel's Election Expenses, 29 Superior Court on page 302.

The fact that the Dairy and Food Commissioner is charged with the enforcement of the Act does not prevent any other citizen from instituting prosecutions thereunder, and in our opinion is not material.

And now, June 24, 1912, the rule for a new trial and also the rule in arrest of judgment in above stated case are discharged.

Per Curiam,
(Signed) W.

To which same day the defendant excepts and an exception is sealed.

(Signed) EMORY A. WALLING, (L. S.),
P. J.

IN THE SUPERIOR COURT OF PENNSYLVANIA

COMMONWEALTH vs. A. B. CROWL.
No. 71 April Term, 1912.
Appeal Q. S. Erie County.
Filed Feb. 27, 1913.

HENDERSON, J.:

The first proposition presented by the appellant is that the title of the Act of March 24, 1909, does not comply with the requirements of section three of article three of the Constitution of Pennsylvania, in that it does not give sufficient notice of the provisions of section four of the statute under which the indictment was drawn. The title to the Act is: "An act for the protection of the public health and to prevent fraud and deception in the manufacture, sale, offering for sale, exposing for sale and having in possession with intent to sell, of adulterated or deleterious ice cream; fixing a standard of butter fat for ice cream; providing penalties for the violation thereof and providing for the enforcement thereof." The fourth section provides that: "No ice cream shall be sold within the State containing less than eight per centum of butter fat, except where fruits or nuts are used for the purpose of flavoring, when it shall not contain less than six per centum of butter fat." We need not refer to the numerous cases which hold that it is not necessary that the title to an Act be an index of the subjects legislated about. It is sufficient if it comprehend the subject involved and fairly puts the inquirer on notice. This Act has a single subject and the title covers it with a comprehensiveness more complete than is usual in legislation. It declares the purpose of the Act and gives notice that penalties are provided for a violation of its terms. One of the things particularly brought to the notice of the reader is that it fixes a standard of butter fat for ice cream, and it was for the violation of the law with reference to this provision that the defendant was convicted. We have no doubt that all of the provisions of the statute are cognate with the title. It is next contended that the enactment is not within the police power of the State in so far as it fixes a standard of butter fat for ice cream. We do not understand that there is any contention that that portion of the fourth section which forbids the manufacture or sale of adulterated or deleterious ice cream is not a proper subject of legislation. We are only concerned, therefore, with the inquiry whether a statute which fixes a standard of quality for ice cream is within the police power. The purpose of the Act was to suppress false pretences and to secure honest dealing in the sale of an article of food. That ice cream is in general use is admitted; that it is largely composed of milk and cream is shown by the evidence in the case. Its name implies the use of cream in its composition and all of the authorities to which the learned counsel for the appellant refers show that milk and cream are constituents in its composition. It enters so largely into the food supply of the public as to have become a proper subject of legislation, especially in view of the opportunities which its manufacture affords to practice imposition. In the popular understanding it is largely composed of milk of which butter fat is an important constituent. If, by the exercise of ingenuity and by the practice of unwarranted thrift a product can be put on the market having the name and appearance of ice cream but lacking the chief element which gives it value as an article of food, a large opportunity would be afforded to dealers in that article to profit by deception and it is the opportunity for such deceit of which the police power takes notice and seeks to take away. It is not necessary that injury has been done or a wrong perpetrated. The possibility that such results may take place warrants legislative intervention under the police power. We are not concerned with the wisdom of legislation under this power. Our only inquiry is whether the power exists. Sovereignty is in the people and is expressed through their legislative representatives by the enactment of their wills into laws. Their authority is general except as restrained by the Constitution of the Commonwealth or the Constitution of the United States, and among legislative capacities one of the largest is the exercise of the police power. It is more easily described than defined, but that it extends to the protection of the lives, health and property of the citizens and to the preservation of good order and the public morals cannot be questioned and these objects are to be provided for by such legislation as the discretion of the law-making body may deem appropriate. It is not a successful denial of the exercise of these powers to say that the prohibited article is wholesome and not injurious to the consumer. The wholesomeness of the prohibited thing will not render the Act unconstitutional. The temptation to fraud and adulteration may be a consideration leading to regulative or prohibitive legislation. If it were not so courts would become the triers of the expediency of such legislation and the authority which the people committed to the legislature would be transferred by judicial action to the courts. Where a statute is clearly and palpably violative of the Constitution it is the duty of the courts to declare it invalid in the respects in which it is repugnant to the supreme law, but the presumptions are all in favor of the validity of legislative enactments and the burden is on him who asserts the contrary to make it clear beyond doubt that the constitutional power has been exceeded. It has been the policy of this State to legislate on the subject of milk and milk products and statutes have been enacted which made it unlawful for any person to sell milk which contained less than a fixed percentage of butter fat and less than a certain percentage of milk solids; making it unlawful to sell cream which contained less than a fixed percentage of butter fat; which classified cheese and fixed the percentage of butter fat which the various classes of cheese should contain; and similar legislation has been enacted in other states: State v. Campbell, 64 N. H. 404; Com. v. Waite, 11 Allen 264; State v. Smyth, 14 R. I. 100. Legislation of a like character is found in the Act of May 21, 1901, forbidding the sale of vinegar which contains less than four per cent. of absolute acetic acid. If the sale of pure milk containing less than three and one-fourth per cent. of butter fat may be prohibited it is not apparent why the same principle does not apply to ice cream. Milk is a natural product—wholesome and useful for food. The milk of many cows contains less than three and one-fourth per cent. of butter fat. The owners of such cattle have a constitutional right to sell the product of their dairies but this right has been held to be subordinate to the public welfare and this welfare demands that a fixed minimum standard of butter-fat shall exist in the whole milk sold in this Commonwealth. The known disposition of some dealers to cheat and the opportunity afforded them by the absence of some regulation of the business is the justification of such legislation under the police power. Through such laws the consumers have the assurance that that which they buy is what it is called and what it appears to be and the opportunity for imposition in selling an adulterated or inferior article of food for that which is wholesome and of a supposed standard of quality is removed. The integrity of the Act is not affected by the provisions that where fruits and nuts are used for flavoring six per cent. of butter fat shall be required in ice cream. It is obvious that the addition of fruits and nuts to a given quantity of ice cream would diminish the percentage of butter fat and it was apparently a consideration of this fact which caused the distinction between ice cream flavored with extracts and that to which nuts or fruits were added. No discrimination is made between individuals or preference given to particular manufacturers by this legislation and no substantial reason is advanced which would make such regulation destructive of the whole statute.

It is not an objection to the prosecution that it was not commenced by the Dairy and Food Commissioner. The functionary was specially charged with the enforcement of the provisions of the statute but that did not disable any citizen of the Commonwealth from appearing as a prosecutor. The offense is a misdemeanor and a prosecution for a violation of the Act might be instituted by any person inclined so to do.

The appellant further contends that the Act under consideration was repealed by the Act of May 13, 1909, relating to food; defining food and providing for the protection of the public health and the prevention of fraud and deception, etc. A comparison of the two Acts shows that the latter contains no provision with reference to the quantity of butter fat necessary in ice cream, nor any provision which is inconsistent with the fourth section of the Act of March 24, 1909, and as there is no express repeal, none arises by necessary implication. An earlier statute is repealed only in those particulars wherein it is clearly inconsistent and irreconcilable with later enactments. The antagonism must be so great as to convince the mind that the last enactment repealed the former. The objects of the two statutes are not the same and if so both can stand, though they may refer to the same subject. Moreover, both of these Acts were passed at the same session of the Legislature and the latter only a few weeks after the former. Under such circumstances there is a presumption against an implied repeal.

We do not regard the examination suggested in the 12th and 13th assignments as permissible. The evidence of the experts as to the possibility that samples of ice cream taken from different parts of a can might or would exhibit a variation of butter fat content would not aid the jury in determining what were the constituents of the sample which the prosecuting witness bought and which the chemist for the Commonwealth analyzed. Mr. Pelton, a witness for the Commonwealth, testified that he bought a pint of chocolate ice cream from the defendant; that he asked for chocolate ice cream and that the defendant delivered to him a pint of ice cream which had the appearance of chocolate ice cream. It was this pint of ice cream which was analyzed and for the sale of which the defendant was prosecuted. It was shown to have had less than three per cent. of butter fat. Theories about what might have been found in some other part of the can from which the witness got his pint would not throw any light on the case. We are unable to obtain a point of view of the case from which we can observe any error in its trial. The case was fairly presented by the learned trial judge and the law expounded in accordance with the principles which govern the case on the undisputed facts.

The assignments are overruled, the judgment is affirmed and the record remitted to the court below to the end that the sentence may be carried into execution.

COMMONWEALTH OF PENNSYLVANIA, }
COUNTY OF ALLEGHENY, } Sct.

I, GEORGE PEARSON, Prothonotary of the Superior Court of Pennsylvania, sitting at Pittsburgh, the said Court being a Court of Record, do hereby certify that the foregoing is a true and correct copy of the whole and entire opinion in the case of Commonwealth vs. Crowl, at No. 71, April Term, 1912, as full, entire and complete as the same remains on file in the said Superior Court, in the case there stated; and I do hereby further certify that the foregoing has been compared by me with the original record in said cause in my keeping and custody as the Prothonotary of said Court, and that the foregoing is a correct transcript from said record, and of the whole of the original thereof.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seal of said Court, at Pittsburgh, in the County of Allegheny, sitting at Pittsburgh, as aforesaid, this sixth day of March, in the year of our Lord one thousand nine hundred and thirteen.

GEORGE PEARSON,
Prothonotary.

(Seal.)

SUPREME COURT OF THE UNITED STATES

Nos. 40 and 50, October Term, 1916.

The Hutchinson Ice Cream Co., et al., Plaintiffs in Error,
vs.
The State of Iowa.
In Error to the Supreme Court of the State of Iowa.

A. B. Crowl, Plaintiff in Error,
vs.
Commonwealth of Pennsylvania.
In Error to the Supreme Court of the State of Pennsylvania.

(December 4, 1916.)

Mr. Justice Brandeis delivered the opinion of the Court.

These cases were argued together. In each a state statute which prohibits the sale of ice cream containing less than a fixed percentage of butter fat is assailed as invalid under the fourteenth amendment; the Supreme Court of each state having held its statute constitutional. *State v. Hutchinson Ice Cream Co.,* 168 Iowa 1; *Commonwealth v. Crowl,* 245 Pa. Stat. 554. Iowa makes 12 per cent. the required minimum; Pennsylvania 8 per cent. The material provisions of the several statutes are copied in the margin.*

The right of the State under the police power to regulate the sale of products with a view to preventing frauds or protecting the public health is conceded by plaintiffs in error. And they do not contend that the particular percentages of butter fat set by Iowa and Pennsylvania are so exacting as to be in themselves unreasonable. Thirteen other states have by similar legislation set 14 per cent. as the minimum; five other states 12 per cent.; only eight states have fixed a percentage as low as Pennsylvania; and the United States Department of Agriculture has declared 14 per cent. to be standard. The main objection urged is this: To require that ice cream, in order to be legally salable, must contain some butter fat is a regulation so unreasonable and arbitrary as to be a deprivation of property without due process of law and a denial of the equal protection of the laws. To support this contention the following trade facts are shown:

The ice cream of commerce is not iced or frozen cream. It is a frozen confection—a compound. The ingredients of this compound may vary widely in character, in the number used and in the proportions in which they are used. These variations are dependent upon the ingenuity, skill and judgment of the maker, the relative cost at a particular time or at a particular place of the possible ingredients, and the requirements of the market in respect to taste or selling price. Thus, some Philadelphia Ice Cream is made of only cream, sugar and a vanilla flavor. In making other Philadelphia Ice Cream the whites of eggs are added; and according to some formulas vanilla ice cream may be made without any cream or milk whatsoever; for instance by proper manipulation of the yolks of eggs, the whites of eggs, sugar, syrup and the vanilla bean. All of these different compounds are commonly sold as ice cream; and none of them is necessarily unwholesome.

Plaintiffs in error contend that as ice cream is shown to be a generic term embracing a large number and variety of products and the term as used does not necessarily imply the use of dairy cream in its composition, it is arbitrary and unreasonable to limit the ice cream of commerce to that containing a fixed minimum of butter fat. But the legislature may well have found in these facts persuasive evidence that the public welfare required the prohibition enacted. The facts show that in the absence of legislative regulation the ordinary purchaser at retail does not and cannot know exactly what he is getting when he purchases ice cream. He presumably believes that cream or at least rich milk is among the important ingredients; and he may make his purchase with a knowledge that butter fat is the principal food value in cream or milk. Laws designed to prevent persons from being misled in respect to the weight, measurement, quality or ingredients of an article of general consumption are a common exercise of the police power. The legislature defines the standard article or fixes some of its characteristics; and it may conclude that fraud or mistake can be effectively prevented only by prohibiting the sale of the article under the usual trade name, if it fails to meet the requirements of the standard set. Laws prohibiting the sale of milk or cream containing less than fixed percentages of butter fat present a familiar instance of such legislation. Cases in the state courts upholding laws of this character are referred to in the margin.* This court has repeatedly sustained the validity of similar prohibitions. *Schmidinger vs. Chicago,* 226 U. S. 578, *Armour & Co. v. North Dakota,* 240 U. S. 510.

It is especially urged that the statutes are unconstitutional because they do not merely define the term ice cream; but arbitrarily prohibit the sale of a large variety of wholesome compounds theretofore included under the name ice cream. The acts appear to us merely to prohibit the sale of such compounds as ice cream. Such is the construction given to the act by the Supreme Court of Iowa.

State v. Hutchinson Ice Cream Co., 168 Iowa 1, 15, which is of course binding on us. We cannot assume, in the absence of a definite and authoritative ruling, that the Supreme Court of Pennsylvania would construe the law of that State otherwise. The conviction here under review was for selling the "compound" as ice cream, so that we are not called upon to determine whether the State may in the exercise of its police power prohibit the sale even of a wholesome product, if the public welfare appear to require such action and if, as here, interstate commerce is not involved. See *Powell v. Pennsylvania,* 127 U. S. 678, 685; *Schollenberger v. Pennsylvania,* 171 U. S. 1, 15.

In view of the conclusions stated above, it is unnecessary to consider whether the statutes are or are not sustainable as health measures; and upon this we express no opinion.

The judgment in each case is affirmed.

(238 U. S. 446.)

W. T. PRICE, Plaintiff in Error,
vs.
PEOPLE OF THE STATE OF ILLINOIS.

Courts (§366*)—Error to State Court—Scope of Review—Statutory Construction.

1. The correctness of a state court's construction of a state statute is simply a question of local law which the Federal Supreme Court cannot review when determining on writ of error to the state court the validity of such statute under the Federal Constitution.

(Ed. Note.—For other cases, see Courts, Cent. Dig. §§954-957, 960-968; Dec. Dig. §366.*)

Constitutional Law (§278*)—Food (§1*)—Due Process of Law—Police Power—Forbidding Sale of Food Preservatives Containing Boric Acid.

2. The prohibition against the sale of food preservatives containing boric acid which is made in the avowed exercise of the police power to protect the public health by Hurd's (Ill) Rev. Stat. chap. 127b, §§8, 22, as construed by the state courts, is not so arbitrary or unreasonable as to amount to a deprivation of property without due process of law.

(Ed. Note.—For other cases, see Constitutional Law, Cent. Dig. §§763, 765, 767-770, 772-777, 779-806, 808-810, 816-824, 907-924, 942; Dec. Dig. §278;* Food, Cent. Dig. §§1, 2; Dec. Dig. §1.*)

Constitutional Law (§239*)—Equal Protection of the Laws—Classification—Sale of Food Preservatives Containing Boric Acid.

3. The sale of food preservatives containing boric acid may be forbidden, as is done by Hurd's (Ill) Rev. Stat. chap. 127b, §§8, 22, as construed by the state courts, without denying the equal protection of the laws.

(Ed. Note.—For other cases, see Constitutional Law, Cent. Dig. §§694, 696; Dec. Dig. §239.*)

Commerce (§41*)—"Original Package"—Envelopes Suitable for Retail Trade.

4. Small packages (envelopes) of a food preservative suitable for the consumer, which are associated in their interstate shipment, and are subsequently sold separately in various lots, cannot be classed as original packages, although respectively in the original envelopes, so as to escape the prohibition of Hurd's (Ill) Rev. Stat. chap. 127b, §§8, 22, against the sale of food preservatives containing boric acid.

(Ed. Note.—For other cases, see Commerce, Cent. Dig. §§30, 31; Dec. Dig. §41.* For other definitions, see Words and Phrases, First and Second Series, Original Package.)

(No. 274.)

Argued May 12, 1915. Decided June 21, 1915.

In error to the Supreme Court of the State of Illinois to review a judgment which affirmed a conviction in the Municipal Court of Chicago, in that state, of a violation of the state pure food law. Affirmed.

See same case below, 257 Ill 587, 101 N. E. 196, Ann. Cas. 1914A, 1154.

The facts are stated in the opinion.

Mr. Trafford N. Jayne for plaintiff in error.

Mr. Lester H. Strawn and Mr. Patrick J. Lucey, Attorney General of Illinois, for defendant in error.

Mr. JUSTICE HUGHES delivered the opinion of the court.

This is a writ of error to review a judgment of the supreme court of Illinois, which affirmed a judgment of the municipal court of Chicago, finding the plaintiff in error guilty of a violation of the "pure food" statute of that state, and imposing a fine. 257 Ill. 587, 101 N. E. 196, Ann. Cas. 1914A, 1154.

The violation consisted of a sale in Chicago of a preservative compound known as "Mrs. Price's Canning Compound," alleged to be intended as a "preservative of food," and to be "unwholesome and injurious in that it contained boric acid."

The statute (Laws of Illinois 1907, p. 543; Hurd's Rev. Stat. chap. 127b, §§8 and 22) provides:

"§8. Defines Adulteration. That for the purpose of this act an article shall be deemed to be adulterated: . . .

"In case of food: . . .

"Fifth—If it contain any added poisonous or other added deleterious ingredients which may render such article injurious to health: Provided, That when in the preparation of food products for shipment they are preserved by an external application, applied in such a manner that the preservative is necessarily removed mechanically, or by maceration in water, or otherwise, and directions for the removal of said preservatives shall be printed on the covering of the package, the provisions of this act shall be construed as applying only when such products are ready for consumption; and formaldehyde, hydrofluoric acid, boric acid, salicylic acid and all compounds and derivatives thereof are hereby declared unwholesome and injurious. . . .

"§22. Sale of Preservatives Prohibited. No person, firm or corporation shall manufacture for sale, advertise, offer or expose for sale, or sell, any mixture or compound intended for use as a preservative or other adulterant of milk, cream, butter or cheese, nor shall he manufacture for sale, advertise, offer or expose for sale, or sell any unwholesome or injurious preservative or any mixture or compound thereof intended as a preservative of any food: Provided, however, That this section shall not apply to pure salt added to butter and cheese."

A trial by jury was waived. There was a stipulation of facts setting forth, in substance, that the defendant had sold in Chicago two packages of the preservative in question; that the compound contained "boric acid"; that the label on the packages bore the following statement: "It is not claimed for this compound that it contains anything of food value, but it is an antiseptic preparation, and among its many uses may be employed to prevent canned fruits and vegetables from souring and spoiling"; that the preservative was not offered for sale or sold in any food product, but only separately as a preservative; and that the defendant was accorded a hearing before the State Food Commission pursuant to the provisions of the food law.

There was also introduced in evidence on behalf of the state an envelope, used for inclosing the compound, upon which were statements as to its uses, prices, etc. It was thus stated that the preservative could be used "in canning all kinds of fruit," and was "especially valuable for corn, beans, peas," etc. There was also the statement on the envelope that the contents "of this package" were sufficient for "four quarts," and that the retail prices were from 10 cents for one "package" to $1 for fifteen "packages." That was the case for the state.

A motion to dismiss was denied. The plaintiff then made an offer of proof, and thereupon it was stipulated that a witness in court, if sworn, would testify that the "Price Canning Compound is an article of commerce, which has been sold under that distinct name for a period of years, with the ingredients and in the proportions contained in the sample taken by the Food Department, which is the subject of this suit; that it has acquired a wide reputation over a large number of states in the Union as a distinctive article, used for canning by the housewife;" that "it is not sold to manufacturers of food or canners of food for sale"; and that "boric acid is a constituent part of the compound and has been such during all the time that the compound has been sold."

Objection to evidence offered that "there is no added ingredient of any kind whatever, whether it be injurious, deleterious, or otherwise," was sustained as not being addressed to the charge made. The defendant (the plaintiff in error) also offered to prove "that boric acid is not injurious to health or to the human system," and that the "Price Canning Compound is not adulterated or mislabeled in any way." The offer was rejected, and the defendant excepted. In response to a further offer, it was conceded that the witness, if placed upon the stand, would testify that the compound "is an article of commerce, sold in Illinois in the original package manufactured in Minnesota."

Upon this state of the record, the contention of the plaintiff in error that the statute was inapplicable, or, if applicable, was repugnant to the Constitution of the state, and to the commerce clause and the 14th amendment of the Federal Constitution, was overruled.

The Supreme Court of the state thus construed the statute:

"We will first notice the objection of plaintiff in error that §8 deals only with foods; that the declaration in that section that boric acid is injurious and unwholesome is limited to foods containing that substance as an added ingredient, and has no application to a preservative which is not, and does not purport to be, a food.

"Both §§8 and 22 are part of one act, and the act as a whole should be so construed as to give effect to its manifest purpose and intent. Its main purpose is to protect health by preventing adulteration of food by any unwholesome and injurious ingredient. Boric acid is declared to be unwholesome and injurious, and the sale of any food to which it is an added ingredient is prohibited. It was well known to the legislature that various compounds are manufactured and sold for preserving foods of different kinds. If such preservatives contain unwholesome and injurious ingredients, their use by the housewife, or anyone else, in preserving fruits or food, would be as injurious to the health as if they had been added by a dealer or manufacturer to fruits or other foods before placing them on the market. The object of the act is to protect the public health by preventing dealers from selling food to which had been added, for the purpose of preserving it, ingredients injurious to the health, or from selling any compound as a preservative which contained any such ingredients. The prohibition is not against the sale of all preservatives, but is against only unwholesome or injurious preservatives. . . . It is just as important to prohibit the sale to the housewife of a compound containing boric acid, to be used by her to preserve fruits and vegetables put up by her for family use, as it is to prohibit the sale of fruits and vegetables after such an ingredient has been added. We think the reasonable construction of the act to be that the prohibition against boric acid is not limited to foods to which it is an added ingredient, but extends to compounds sold as a food preservative which contain boric acid. The danger to health is as great from one as the other, and the prohibition of both was necessary to effect the evident purpose of the legislature." 257 III. pp. 592, 593.

The plaintiff in error challenges the correctness of this construction, but this question is simply one of local law with which we are not concerned. We accept the decision of the Supreme Court of the state as to the meaning of the statute, and, in the light of this construction, the validity of the act under the Federal Constitution must be determined. Missouri P. R. Co. v. Nebraska, 164 U. S. 403, 414, 41 L. ed. 480, 494, 17 Sup. Ct. Rep. 130; W. W. Cargill Co. v. Minnesota, 180 U. S. 452, 466, 45 L. ed. 619, 925, 21 Sup. Ct. Rep. 423; Lindsley v. National Carbonic Gas Co. 220 U. S. 61, 73, 55 L. ed. 369, 375, 31 Sup. Ct. Rep. 337, Ann. Cas. 1912C, 160; Purity Extract Tonic Co. v. Lynch, 226 U. S. 192, 198, 57 L. ed. 184, 186, 33 Sup. Ct. Rep. 44.

The first Federal question is presented by the contention that the statute, as applied, effects a deprivation of property without due process of law and a denial of the equal protection of the laws, contrary to the 14th amendment.

The state has undoubted power to protect the health of its people and to impose restrictions having reasonable relation to that end. The nature and extent of restrictions of this character are matters for the legislative judgment in defining the policy of the state and the safeguards required. In the avowed exercise of this power, the legislature of Illinois has enacted a prohibition—as the statute is construed—against the sale of food preservatives containing boric acid. And unless this prohibition is palpably unreasonble and arbitrary we are not at liberty to say that it passes beyond the limits of

the state's protective authority. Powell v. Pennsylvania, 127 U. S. 678, 686, 32 L. ed. 253, 257, 8 Sup. Ct. Rep. 992; 1257; Crowley v. Christensen, 137 U. S. 86, 91, 34 L. ed. 620, 623, 11 Sup. Ct. Rep. 13; Holden v. Hardy, 169 U. S. 366, 395, 42 L. ed. 780, 792, 18 Sup. Ct. Rep. 383; Capital City Dairy Co. v. Ohio, 183 U. S. 238, 246, 46 L. ed. 171, 175, 22 Sup. Ct. Rep. 120; Jacobson v. Massachusetts, 197 U. S. 11, 25, 49 L. ed. 643, 649, 25 Sup. Ct. Rep. 358; 3 Ann. Cas. 765; New York ex rel. Silz v. Hesterberg, 211 U. S. 31, 39, 53 L. ed. 75, 79, 29 Sup. Ct. Rep. 10; McLean v. Arkansas, 211 U. S. 539, 547, 53 L. ed. 315, 319, 29 Sup. Ct. Rep. 206; Chicago, B. & Q. R. Co. v. McGuire, 219 U. S. 549, 569, 55 L. ed. 328, 339, 31 Sup. Ct. Rep. 259; Purity Extract and Tonic Co. v. Lynch, 226 U. S. 192, 198, 57 L. ed. 184, 186, 33 Sup. Ct. Rep. 44; Hammond Packing Co. v. Montana, 233 U. S. 331, 333, 58 L. ed. 985, 987, 34 Sup. Ct. Rep. 596. The contention of the plaintiff in error could be granted only if it appeared that by a consensus of opinion the preservative was unquestionably harmless with respect to its contemplated uses; that is, that it indubitably must be classed as a wholesome article of commerce so innocuous in its designed use and so unrelated in any way to any possible danger to the public health that the enactment must be considered as a merely arbitrary interference with the property and liberty of the citizen. It is plainly not enough that the subject should be regarded as debatable. If it be debatable, the legislature is entitled to its own judgment, and that judgment is not to be superseded by the verdict of a jury upon the issue which the legislature has decided. It is not a case where the legislature has confined its action to the prohibition of that which is described in general terms as unwholesome or injurious, leaving the issue to be determined in each case as it arises. The legislature is not bound to content itself with general directions when it considers that more detailed measures are necessary to attain a legitimate object. Atlantic Coast Line R. Co. v. Georgia, 234 U. S. 280, 288, 58 L. ed. 1312, 1316, 34 Sup. Ct. Rep. 829. Legislative particularization in the exercise of protective power has many familiar illustrations. The present case is one of such particularization, where the statute—read as the state court reads it—especially prohibits preservatives containing boric acid. The legislature thus expressed its judgment, and it is sufficient to say, without passing upon the opinions of others adduced in argument, that the action of the legislature cannot be considered to be arbitrary. Its judgment appears to have sufficient support to be taken out of that category. See Hipolite Egg Co. v. United States, 220 U. S. 45, 51, 55 L. ed. 364, 365, 31 Sup. Ct. Rep. 364; Circular No. 15 (June 23, 1904), Bureau of Chemistry; Food Inspection Decision 76 (July 13, 1907); Bulletin (December 31, 1914), Bureau of Chemistry; U. S. Department of Agriculture.

It is further urged that the enactment, as construed, contains an unconstitutional discrimination against the plaintiff in error, but in this aspect, again, the question is whether the classification made by the Legislature can be said to be without any reasonable basis. The legislature is entitled to estimate degrees of evil, and to adjust its legislation according to the exigency found to exist. And, applying familiar principle, it cannot be said that the legislature exceeded the bounds of reasonable discretion in classification when it enacted the prohibition in question relating to foods and compounds sold as food preservatives. Ozan Lumber Co. v. Union County Nat. Bank, 207 U. S. 251, 256, 52 L. ed. 195, 197, 28 Sup. Ct. Rep. 89; Heath & M. Mfg. Co. v. Worst, 207 U. S. 338, 354, 52 L. ed. 236, 243, 28 Sup. Ct. Rep. 114; Lindsley v. Natural Carbonic Gas Co., 220 U. S. 61, 78, 55 L. ed. 369, 377, 31 Sup. Ct. Rep. 337; Ann. Cas. 1912C, 160; Mutual Loan Co. v. Martell, 222 U. S. 225, 235, 56 L. ed. 175, 179, 32 Sup. Ct. Rep. 74, Ann. Cas. 1913B, 529; Eberle v. Michigan, 232 U. S. 700, 706, 58 L. ed. 803, 806, 34 Sup. Ct. Rep. 464; Keokee Consol. Coke Co. v. Taylor, 234 U. S. 224, 227, 58 L. ed. 1288, 1289, 34 Sup. Ct. Rep. 856; Miller v. Wilson, 236 U. S. 373, 383, 384, 59 L. ed. —, 35 Sup. Ct. Rep. 342. We find no ground for holding the statute to be repugnant to the 14th amendment.

The remaining contention is that the statute as applied violates the commerce clause. Treating the article as one on a footing with adulterated food, the power of the state to prohibit sales within its borders is broadly asserted on its behalf. On the other hand, the plaintiff in error insists that the compound is not an adulterated food, and was not charged to be such, but was an article of commerce manufactured in another state; and that whatever may be the power of the state of Illinois over manufacture and sale apart from interstate commerce, the state could not prohibit its introduction and sale in the course of interstate commerce. It is not necessary, however, to deal with the question in the scope thus suggested. The sole ground for invoking the commerce clause in order to escape the restrictions of the state law is sought to be found in the doctrine with respect to sales in original packages. Brown v. Maryland, 12 Wheat. 419, 6 L. ed. 678; Leisy v. Hardin, 135 U. S. 100, 34 L. ed. 128, 3 Inters. Com. Rep. 36, 10 Sup. Ct. Rep. 681; Schollenberger v. Pennsylvania, 171 U. S. 1, 22, 23, 43 L. ed. 49, 57, 18 Sup. Ct. Rep. 75. The record, however, is wholly insufficient to support the contention. The stipulation of facts read in evidence by the state set forth that the defendant had sold in Chicago "two packages" of the compound. The state then introduced in evidence an "envelope used for inclosing the compound." This, among other things, bore a statement that the content of "this package is sufficient for four quarts." And it set forth prices as follows: "Retail Price. 1 Package, 10c. 3 Packages, 25c. 7 Packages, 50c. 15 Packages, $1." The clear inference from this evidence was that the compound was offered for sale at retail in small packages (in envelopes) suitable for the consumer. The defendant made an offer of proof, and in lieu of the offered testimony it was conceded that the witness, if sworn, would testify that the compound mentioned in the statement of claim "is an article of commerce sold in Illinois, in the original package manufactured and made in Minnesota." As to the nature of the package, nothing more was shown. All that was admitted was entirely consistent with the view that the original package referred to was simply the small package in the envelope which the state had described, and no error can be charged to the state court in so regarding it. Nothing appeared as to the character of the shipment from Minnesota to Illinois, and it would be wholly unjustifiable to assume that, in commercial shipments into the state, the small package was segregated or separately introduced. If these small packages were associated in their shipment into the state, as they naturally would be, and were subsequently sold separately or in various lots, these separate packages, although respectively in the original envelopes, would not be classed as "original packages" within the rule invoked, so as to escape the local law governing domestic transactions. We have repeatedly so held, in cases not materially different in this respect. Austin v. Tennessee, 179 U. S. 343, 45 L. ed. 224, 21 Sup. Ct. Rep. 132; Cook v. Marshall County, 196 U. S. 261, 49 L. ed. 471, 25 Sup. Ct. Rep. 233; Purity Extract and Tonic Co. v. Lynch, 226 U. S. 192, 199-201, 57 L. ed. 184, 186-188, 33 Sup. Ct. Rep. 44. The testimony offered by the plaintiff in error, and treated as received, taken in connection with what had already been proved as to the character of the packages put up for retail sale, fell far short of the proof required to constitute a defense upon the ground that the state law, otherwise valid, was applied in contravention of the commerce clause.

It should be added that no question is presented in the present case as to the power of Congress to make provision with respect to the immediate containers (as well as the larger receptacle in which the latter are shipped) of articles prepared in one state and transported to another, so as suitably to enforce its regulations as to interstate trade. McDermott v. Wisconsin, 228 U. S. 115, 135, 57 L. ed. 754, 767, 47 L. R. A. (N. S.) 984, 33 Sup. Ct. Rep. 431. It does not appear that the state law as here applied is in conflict with any Federal rule.

Judgment affirmed.

REPORT OF THE BUREAU OF ECONOMIC ZOOLOGY

Hon. Charles E. Patton, Secretary of Agriculture.

Dear Sir: It is incumbent on me to furnish a report for the Bureau of Economic Zoology, for the year ending December 31, 1916; although my connection with this Bureau dates only from September 15, 1916.

Some decided changes in policy and character of work are planned for this Bureau, which will be carried out and reported in a subsequent annual report.

That portion of this report relating to the apiary inspection has been prepared substantially as it appears by Mr. Geo. H. Rea, Chief Apiary Inspector, in 1916.

Yours very truly,
J. G. SANDERS,
Economic Zoologist.

PERSONNEL

The persons employed in this office during the year were Prof. H. A. Surface, my predecessor, who resigned August 15, the work being carried on until my arrival, September 15, by Mr. P. T. Barnes, Assistant Zoologist.

Other changes in the personnel of the office force during the year were Mr. J. K. Knull, of Hummelstown, appointed Scientific Assistant on October 1st, and Mr. Albert Sawyer, Clerk, resigned to take effect November 15, he having found more lucrative work in other lines.

Miss Mary E. Evans was transferred from this office to the office of the Director of Farmers' Institutes early in the year. The other employees of the office are the same as reported last year:—

Mr. E. B. Engle, Chief Nursery Inspector, and Francis Windle,* Deputy Nursery Inspector, the latter taking charge of nursery inspection work in the Philadelphia district.

Miss Katharyn P. First and Miss Helen M. Nesbit, Stenographers; Miss Annia L. Boyer, Clerk.

Mr. V. A. E. Daecke, Clerk in charge of insect collections

Mr. Harry B. Kirk, Clerk in charge of photographic work.

Mr. J. C. Simmons, Messenger.

As in former years the Bureau of Zoology has had field men distributed throughout the state. The district of each man is as follows:

Name.	Address.	District.
R. P. Allaman,	Bedford, Pa.	Somerset, Bedford and Fulton Counties.
H. E. Backus,	North East, Pa.	Erie and Crawford Counties.
M. L. Benn,	Coudersport, Pa.	Cameron, Potter and Tioga Counties.
James Bergy,	Mifflintown, Pa.	Blair, Huntingdon, Mifflin, Juniata and Snyder Counties.

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*Deceased.

E. C. Bowers,	East Petersburg, Pa.	York and Lancaster Counties.
J. S. Briggs,	Norristown, Pa.	Clearfield, Cambria and Montgomery Counties.
A. W. Buckman,	South Langhorne, Pa.	Carbon, Bucks and Northampton Counties.
W. H. Bullock,	Honesdale, Pa.	Wayne, Pike and Monroe Counties.
Ira C. Cherrington,	Catawissa, Pa., R. D. 2.	Columbia, Montour, Union, and that portion of Northumberland County above the north branch of the Susquehanna River.
John W. Cox,	New Wilmington, Pa.	Mercer, Lawrence and Beaver Counties.
A. O. Finn,	Forest City, Pa., R. D. 1.	Susquehanna, Lackawanna and Luzerne Counties.
Cyrus T. Fox,	Reading, Pa.	Berks and Schuylkill Counties.
F. L. Holdridge,	Tidioute, Pa.	Warren, McKean, Forest and Elk Counties.
D. A. Knuppenberg,	Drexel Hill, Pa.	Bradford, Sullivan and Wyoming Counties.
S. W. Kerr,	Stony Creek Mills.	Lebanon, Dauphin and Perry Counties, and that portion of Northumberland County south of the north branch of the Susquehanna River.
E. L. Loux,	Souderton, Pa.	Washington, Fayette and Greene Counties.
B. S. Moore,	Kulpsville, Pa.	Jefferson, Indiana and Lehigh Counties.
E. F. Peirce,	Swarthmore, Pa.	Cumberland, Franklin and Adams Counties.
M. E. Shay,	Holmesburg, Pa.	Philadelphia, Delaware and Chester Counties.
G. B. Stichter,	Pottsville, Pa.	Venango, Clarion and Armstrong Counties.
H. E. Taylor,	Chicora, Pa.	Butler, Allegheny and Westmoreland Counties.
J. C. Wilson,	Wallisrun, Pa.	Clinton, Centre and Lycoming Counties.

Field meetings were held during March and April at which the pruning of fruit trees was illustrated by actual work in the trees, and the control of pests by a dormant spray of lime-sulfur was demonstrated.

The field meetings customarily held in the late spring and early summer, to demonstrate the best methods of controlling the codling moth and other insects, were abandoned this year because of lack of funds A different plan of utilizing the field men was employed this season. Instead of having them continue the second inspection started last year, this office tried to reach as many farmers and fruit growers as possible by having the inspector locate for a few days in a given locality, from which he visited those in the surrounding territory. In this manner many fruit growers were helped, but the Bureau did not reach as many people as had been hoped for, as the growers were busy harvesting farm crops.

HORTICULTURAL INSPECTION

The horticultural inspection work may be discussed readily under two groups, (1) Nursery, (2) Imported Plants.

The nursery inspection in 1916 was done by several employees of the Bureau, including the orchard inspectors, some of whom were fairly well equipped for the work. The thoroughness of the work was not all that could be desired, however, so that under present plans, future nursery inspection will be considerably improved by installing a force of trained men.

The inspection of imported plants was more thoroughly done than in previous seasons, but great improvement in this phase of the work is promised for the future. The extreme danger of importing and establishing some destructive pests from foreign countries, is an ever present menace so long as miscellaneous plant importations from many foreign sources are permitted by our government.

On account of war conditions, the quantity of imported plants for inspection, was materially reduced this last season, nevertheless more thorough and accurate inspection has required much effort and time.

NEW HORTICULTURAL INSPECTION LAW PROPOSED

A new law governing the horticultural inspection in the state, is proposed and will be introduced for legislative action. This bill is drawn along the exact lines of the uniform bill adopted by the American Association of Nurserymen, and the American Association of Horticultural Inspectors, which urges greater uniformity in state laws pertaining to horticultural inspection. It is hoped that the law will be passed and in operation by the summer of 1917.

LIST OF NURSERIES LICENSED

Name.	Address.	Acres.
Adams County.		
H. G. Baugher,	Aspers,	26
W. W. Boyer & Bro.,	Arendtsville,	2
E. W. Hartman,	Cashtown,	3
C. A. Hartman,	Cashtown,	2
Geo. Oyler & Sons,	Gettysburg,	1
H. R. Plank,	York Springs,	6
C. A. Stoner,	Gettysburg,	1
D. I. Weaver,	Gettysburg,	1
Chester B. Worley,	York Springs,	4
Allegheny County.		
Allegheny Nursery Co.,	Cheswick,	½
Elliott Nursery Co.,	Springdale,	30
August Espe,	Perrysville,	1
George Bros.,	Springdale,	3½
Keystone State Nurseries, 612 Union Bank Bldg.,	Pittsburgh,	2
McRae-Jenkinson Co. (Florists),	Cheswick,	
A. W. Smith Co., Keenan Bldg.,	Pittsburgh,	½
Beaver County.		
*J. P. Arnold & Bro.,	Beaver Falls,	4
*J. M. Hoyt,	Industry,	7
R. C. Mackall,	Beaver,	2
Berks County.		
Bertrand H. Farr,	Wyomissing,	265
John H. Giles,	Reading,	4
Thos. J. Oberlin,	Sinking Springs,	5
Blair County.		
Geo. S. Burket,	Claysburg,	½

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*Grow berries or small fruit plants only.

Name.	Address.	Acres.
Bradford County.		
F. W. Card,	Sylvania,	1
*Mrs. Fannie S. Caster,	New Albany,	¼
*Mrs. W. F. Baker,	Wyalusing,	3
Bucks County.		
Mahlon B. Fretz,	Newton,	6
D. Landreth Seed Co.,	Bristol,	2
J. L. Lovett,	Emilie,	10
The Wm. H. Moon Co.,	Morrisville,	450
National Farm School,	Farm School,	3
Penna. R. R. Co., John Foley, Forester, Philadelphia, Nursery near,	Morrisville,	40
The Styer Gardens,	Woodbourne,	1
M. A. Youngken,	Richlandtown,	¼
Butler County.		
Harmony Nurseries, Inc.,	Evans City,	½
James R. Peirce,	Butler,	1
Centre County.		
College Department of Horticulture,	State College,	
Chester County.		
John Alcorn,	Malvern,	¼
Milton Clevenstine,	Kimberton,	1
The Conard & Jones Co.,	West Grove,	45
H. H. Cornson & Son,	Ivondale,	3
The Dingee & Conard Co.,	West Grove,	45
W. H. Doyle,	Berwyn,	50
Louis B. Eastburn,	Kennett Square,	2
Chas. E. Haywood,	Westtown,	3
Hoopes Bro. & Thomas Co.,	West Chester,	600
E. B. Keating,	Kennett Square,	2
The Morris Nursery Co.,	West Chester,	150
Pennypacker & Son,	Phoenixville,	¼
The Rakestraw Pyle Co.,	Kennett Square,	200
J. B. Reiff,	Spring City,	½
Frank M. Thomas,	West Chester,	2
Carl B. Thomas,	West Chester,	1½
Clearfield County.		
Penna. Dept. of Forestry (W. F. Dague, Forester),	Clearfield,	4
W. S. Wright,	Clearfield,	¼
Columbia County.		
Philip Harris, R. F. D. No. 5,	Bloomsburg,	1½
Frank Harris,	Orangeville,	1
T. D. Robbins, R. F. D. No. 5,	Bloomsburg,	½
Crawford County.		
*W. A. Andre,	Cochranton,	2¼
*Bailey Bros.,	Cochranton,	11
*C. P. Bailey,	Geneva,	2½
*E. A. Bisbee,	Titusville,	2
O. C. Deeter,	Cochranton,	8
F. M. Fleming,	Cochranton,	½
David Kelty,	Cochranton,	1½
*J. B. Long,	Harmonsburg,	¼
*Edw. McNamara, R. F. D. No. 8,	Meadville,	1½
*J. W. Marsh,	Geneva,	3
*W. H. Miller,	Guys Mills,	½
*Henry Roberts,	Cochranton,	3½
*S. C. Homan,	Cochranton,	2

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*Grow berries or small fruit plants only.

Name.	Address.	Acres.
Cumberland County.		
J. F. Rupp,	Shiremanstown,	¼
Mrs. E. H. Spain,	Camp Hill,	¼
R. A. Wickersham,	Mechanicsburg,	35
H. A. Surface,	Mechanicsburg,	¼
Dauphin County.		
The Berryhill Nursery Co.,	Harrisburg,	30
*M. S. Brinser,	Middletown,	1
J. A. Christman,	Fort Hunter,	½
*Andrew Coble,	Middletown,	½
C. B. Landis,	Penbrook,	¼
*David Z. Miller,	Middletown,	1
C. P. Scholl,	Halifax,	5
Robt. Walton,	Hummelstown,	¼
Harrisburg Park Nursery, E. Z. Gross, Supt.,	Harrisburg,	3
Delaware County.		
H. H. Battles,	Newtown Square,	5
W. E. Caum (Lessee),	Haverford,	15
John G. Gardner,	Bryn Mawr,	15
Otto Lochman,	Wallingford,	2
C. H. Pettiford,	Lansdowne,	½
M. J. Porter,	Wayne,	3
J. J. Styer,	Concordville,	10
Sylvia Spoltore,	Collingdale,	½
E. A. Stroud,	Strafford,	23
Mrs. Elizabeth Supplee,	Collingdale,	5
Erie County.		
Bauer Floral Co.,	Erie,	1½
*J. J. Bernot,	Moorheadville,	3½
W. C. Eagley,	North Girard,	4
L. C. Hall,	Avonia,	¼
F. C. Hetz,	Fairview,	10
P. O. Kennedy,	Cranesville,	½
Ross Kocher,	North East,	1
John G. Kuhn,	North East,	¼
Lake Shore Nurseries,	Girard,	10
J. V. Laver,	Erie,	½
*H. S. Loop,	North East,	1
*R. C. Mason,	North Girard,	2
*Leon D. Moore,	Corry,	2
F. G. Mohring,	North Girard,	4
*J. W. Orton,	North East,	1¼
*E. A. Orton,	North East,	1
Penna. Nursery Co.,	Girard,	50
*C. S. Post,	North East,	6
*Amos C. Remington,	North East,	8
Stark Bros., Nurseries & Orchards Co.,	North Girard.	125
*W. L. Silverthorn,	North Girard,	3
*W. E. Smith,	North East,	2
Verne L. Schluroff,	Erie,	¼
*Geo W. Wood, R. F. D. No. 8,	Corry,	1
*A. F. Youngs,	North East,	2
*A. J. Youngs,	North East,	1
L. G. Youngs,	North East,	1
Franklin County.		
Mira L. Dock,	Fayetteville,	¼
Henry Eicholtz (Florist),	Waynesboro,	
Penna. Dept. of Forestry (Mont Alto Nursery), Geo. A. Retan, Forester,	Mont Alto,	5
Penna. Dept. of Forestry (Robt. G. Conklin, Forester),	Fayetteville,	¼
*C. W. Reichard,	Waynesboro,	1

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*Grow berries or small fruit plants only.

Name.	Address.	Acres.
Elk County.		
Elk Nurseries,	Ridgway,	1½
Huntingdon County.		
G. B. Norton,	Trough Creek,	¼
J. A. Runk,	Huntingdon,	¼
Juniata County.		
*Andrew Banks,	Mifflintown,	8
*S. H. Graybill,	Richfield,	5
*J. K. Oberholtzer,	Mifflintown,	1½
*O. J. Pellman & Son,	Richfield,	5
*John H. Shellenberger,	McAllisterville,	6½
Lackawanna County.		
Daniel O'Hara,	Dunmore,	¼
John W. Shepard, 945 Clay Avenue,	Scranton,	4
Lancaster County.		
B. F. Barr & Co.,	Lancaster,	26
W. P. Bolton & Son,	Holtwood,	4
Maurice P. Brinton,	Christiana,	6
Mrs. Matilda Drayer, R. F. D. No. 1,	Bainbridge,	1
David S. Herr, R. F. D. No. 7,	Lancaster,	22
J. F. Jones,	Willow Street,	15
D. M. King. R. F. D. No. 2,	Gordonville,	3
O. W. Laushey,	Smoketown,	2½
N B. Leaman,	Lititz,	½
Jacob D. Mellinger, R. D. F. No. 6,	Lancaster,	2½
Masonic Home, J. Franylin Heckler, Supt.,	Elizabethtown,	3
M. H. Musser, R. F. D. No. 1,	New Providence,	½
Geo. W. Park,	La Park,	1
J. W. Root, R. F. D. No. 1,	Manheim,	20
John G. Rush,	Willow Street,	¼
Fred Spinner,	Lititz,	½
Lawrence County.		
Butz, Bros.,	New Castle,	¼
A. S. Moore,	New Castle,	
Lehigh County.		
*Mrs. Preston J. Kline,	Coopersburg,	½
Lehigh Nurseries,	Allentown,	1
*Oscar Young,	Coopersburg,	1
Luzerne County.		
R. S. Barry,	White Haven,	
*Keystone Strawberry Co.,	Hazleton,	3
Miss M. A. Maffett,	Wilkes-Barre,	¼
Warren E. Straw,	Wilkes-Barre,	2
F. B. Wheeler,	Wyoming,	½
Lycoming County.		
J. C. Moore,	Montoursville,	3
McKean County.		
J. C. Galloway,	Port Allegany,	2
Dan S. Helman and Howard Hall,	Port Allegany,	2
Mercer County.		
*A. W. Carlson,	Stoneboro,	3
W. R. Cribbs,	Mercer,	¼
*Augustus Doyle,	Stoneboro,	5
*Olaf Hansen,	Stoneboro,	2
Hugh Hogue, R. F. D.,	Carlton,	1

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*Grow berries or small fruit plants only.

Name.	Address.	Acres.
Mercer County—Continued.		
*J. N. Hughes,	Mercer,	1
Lackawonnock Orchards,	Mercer,	½
*H. H. McClearn,	Stoneboro,	3
*B. R. McClearn,	Stoneboro,	1½
Mifflin County.		
Penna. Dept. of Forestry, Tom O. Bietsch, (Forester), Nursery and Forest Reservation neah Greenwood, McAlevys Fort, Huntingdon Co., Pa.,		3
*A. K. Beiler,	Belleville,	1½
Monroe County		
W. K. La Bar,	East Stroudsburg,	
Montgomery County.		
John Albrecht,	Pencoyd,	6
J. F. Birmingham,	Weldon,	½
Alex Cummings & Son,	Centre Square,	½
James R. Gillen,	Ambler,	12
R. B. Haines Co.,	Cheltenham,	10
J. B. Heckler,	Lansdale,	¼
J. Krewson & Sons,	Cheltenham,	50
Chris Koehler,	Cheltenham,	2
Thos. J. Lane,	Dresher,	10
Harry O. Leopold, R. F. D. No. 3,	Royersford,	¼
Thomas B. Meehan Co.,	Dresher,	215
J. B. Moore,	Hatfield,	1
Adolph Muller,	Norristown,	30
Penna. School of Horticulture for Women,	Ambler,	5
J. G. Steffin,	Norristown,	5
Wm. Sturzebecher,	Lansdale,	1
Somerton Nurseries, A. U. Bannard, Mgr., 125 S. Fifth Street, Philadelphia,	Somerton,	20
J. W. Thomas & Sons,	King of Prussia,	90
A. E. Wohlert,	Narberth,	15
J. H. Zeigler, R. F. D. No. 1,	Red Hill,	¼
Northampton County.		
Easton Cemetery Co.,	Easton,	½
Hays Nursery Co.,	Easton,	¼
Northumberland County.		
S. L. Cummings,	Dewart,	1
A. S. DeWitt, R. F. D. No. 1,	Fisher's Ferry,	½
F. L. Hancock,	Dalmatia,	¼
Perry County.		
Silas Dewalt,	Landisburg,	½
Geo. A. Wagner, R. F. D.,	Landisburg,	1½
Philadelphia County.		
Harry S. Betz, Wyoming Avenue,	Olney,	18
James W. Burke, Sr.,	Tacony,	¼
W. Atlee Burpee,	Philadelphia,	
Dr. Thos. J. Clemens, Inquirer Bldg.,	Philadelphia,	12
W. W. Harper,	Chestnut Hill,	500
John B. Lewis,	Torresdale,	10
Thos. Meehan & Sons, Inc.,	Germantown,	60
H. F. Michel Co.,	Philadelphia,	49
A. F. O'Connell,	Overbrook,	100
Phila. & Reading R. R. Co., Nursery at Wayne Junction,	Philadelphia,	¼
John Stevenson's Son,	Oak Lane,	2

*Grow berries or small fruit plants only.

Name.	Address.	Acres.
Philadelphia County—Continued.		
John C. Wister,	Germantown,	¼
T. N. Yates & Co.,	Mt. Airy,	6
Myers & Sautinan (Florists),	Chestnut Hill,	
Potter County.		
M. L. Benn,	Coudersport,	3
Snyder County.		
*Geo. W. Beaver, R. F. D. No. 4,	Middleburg,	2
*John F. Boyer, R. F. D. No. 4,	Middleburg,	4½
*Geo. H. Dreese,	Mt. Pleasant Mills,	2
*E. O. Shafer,	Port Treverton,	2
*Allen S. Sechrist, R. F. D. No. 2,	Port Treverton,	1½
Susquehanna County.		
*E. A. Smith,	Heart Lake,	6
*Geo. P. Sprout, R. F. D. No. 66,	Montrose,	3
Tioga County.		
Penna. Dept. of Forestry, Paul H. Mulford, Forester,	Aseph,	12
Milton Stowell, R. F. D. No. 3,	Wellsboro,	2½
Union County.		
C. K. Sober (Nursery near Paxinos, Northumberland Co.,	Lewisburg,	50
Warren County.		
*Norris, Towne & Holtham, S. G. Confer, Supt.,	Akeley,	1¼
Washington County.		
Keystone State Nurseries,	Finleyville,	10
Wayne County.		
The Chas. G. Curtis Co. (Nursery near Damascus, Pa.),	Callicoon, N. Y.,	75
A. V. Tyler,	Damascus,..	40
Westmoreland County.		
Joseph Thomas,	Greensburg,	¼
Wyoming County.		
*F. H. Fassett,	Meshoppen,	2¼
*Wm. Lutes, R. F. D. No. 5,	Tunkhannock,	4
*W. E. Shoemaker,	Laceyville,	2½
Dr. Eugene Underhill (Nursery at Laceyville..), 1904 Chestnut Street,	Philadelphia,	1
York County.		
D. S. Auchey & Son,	Hanover,	½
W. J. Blocher,	Hanover,	3
P. M. Craley,	Red Lion,	¼
F. E. Cremer,	Hanover,	½
John B. Hersey,	Stewartstown,	5
W. S. Newcomer,	Glenrock,	4
Patterson Nursery Co.,	Stewartstown,	2
Geo E. Stein,	East Prospect,	6

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*Grow berries or small fruit plants only.

AGENTS AND DEALERS, SEPTEMBER 1, 1916-1917.

County.	Name.	Address.
Allegheny	John Bader Co.,	Pittsburgh.
	W. B. Bockstose,	Castle Shannon.
	Campbells,	Pittsburgh.
	E. C. Hauser,	Emsworth.
	Mark E. Head, 230 Rodgers Ave.,	Bellevue.
	Frank C. Honess, 243 Sprague Ave.,	Bellevue.
	Jos. Horne & Co.,	Pittsburgh.
	Igel-Rothstein Co., at Rosenbaum's,	Pittsburgh.
	Kauffman Bros., Dept. Stores, Inc.,	Pittsburgh.
	Kauffman & Baer Co.,	Pittsburgh.
	A. W. Smith Co., Keenan Bldg.,	Pittsburgh.
	J. F. Zimmerman, 6624 Penn Ave.,	Pittsburgh.
Armstrong	B. E. Long, R. F. D. No. 1,	Dayton.
Beaver	A. E. Crouch,	Rochester.
	James S. Eckler,	Vanport.
	J. H. Gutermoth,	Rochester.
	J. L. R. Hart,	Beaver Falls.
	J. C. Withrow,	Vanport.
Bedford	W. D. Slick,	New Paris.
Berks	Alfred S. Dreibelbis,	Reading.
	Howard N. McKinney, R. F. D. No. 1,	Sinking Springs.
	M. E. Smeltzer, 131 Greenwich St.,	Reading.
	J. K. Wagaman,	Klinesville.
Blair	E. C. Miller,	Lakemont.
	E. J. Whitbred,	Altoona.
Bucks	John F. Barclay, R. F. D. No. 2,	Doylestown.
	Quakertown Plant Co., C. E. Bartholomew, Proprietor,	Quakertown.
Butler	W. C. Riddle,	Slippery Rock.
Carbon	Paul Nichoff,	Lehighton.
Chester	John Alcorn,	Malvern.
Clearfield	Wm. G. Jones,	Du Bois.
	Thos. W. Monroe,	Du Bois.
Crawford	J. C. Boyd,	Guy's Mills.
	F. M. Fleming,	Cochranton.
	A. B. Greenfield & Sons,	Conneautville.
	J. A. Knapp,	Meadville.
	B. D. Maynard, 720 Grant St.,	Meadville.
Cumberland	Ira E. Bigler,	Camp Hill.
	D. F. Haskell,	Carlisle.
	D. C. Rupp,	Shiremanstown.
	Towser & Son,	Carlisle.
Dauphin	Geo. F. Greenawalt,	Hummelstown.
	Holmes Seed Co.,	Harrisburg.
	J. R. Snavely, 125 Liberty St.,	Harrisburg.
	T. A. Woods, 919 N. 6th St.,	Harrisburg.
	Dives, Pomeroy & Stewart,	Harrisburg.
Erie	C. F. Amidon,	North East.
	H. C. Pettis,	Flatea.
	C. J. Roberts,	Albion.
Fayette	Klairdale Floral Co.,	Connellsville.
Franklin	H. C. Ely,	Waynesboro.
Lackawanna	G. R. Clark, 124 Washington St.,	Scranton.
	Giles L. Clark, 900 Wood St.,	Scranton.
	A. J. Noble,	Scranton.
	J. H. Ryan, 1367 Penn Ave.,	Scranton.
Lancaster	John G. Engle,	Marietta.
	Daniel G. Engle,	Marietta.
	Amos D. Herr, 510 W. Orange St.	Lancaster.
Lebanon	C. A. Kauffman,	Richland.
	J. M. Smeltzer,	Myerstown.
	C. C. Yost,	Lebanon.
Lehigh	Samuel I. Leh,	Allentown.
Luzerne	J. D. Anderson & Son,	Laketon.
	S. Markofski, 53 W. Green St.,	Nanticoke.
	P. J. Sweeney,	Pittston.
Lycoming	Evenden Bros.,	Williamsport.

AGENTS AND DEALERS—Continued.

County.	Name.	Address.
McKean	F. S. Palmer,	Bradford.
Monroe	B. P. Smiley, 311 N. 8th St.,	Stroudsburg.
Montgomery	The Property Owners Improvement Co., J. J. Benkert, Mgr.,	Penllyn.
Northampton	Theodore Roth,	Nazareth.
Northumberland	L. W. Foust,	Milton.
	H. F. Frank,	Montandon.
Philadelphia	J. R. Giffin, 5341 Webster St.,	Philadelphia.
	Gimbel Bros., Inc.,	Philadelphia.
	Lit Bros.,	Philadelphia.
	Wm. Henry Maule, Inc.,	Philadelphia.
	Moore Seed Co.,	Philadelphia.
	Philadelphia Nursery Co., 1320 S. 52d St.,	Philadelphia.
	Strawbridge & Clothier,	Philadelphia.
	N. Snellenburg & Co.,	Philadelphia.
	John Wanamaker,	Philadelphia.
	Hosea Waterer, 107 S. 7th St.,	Philadelphia.
Schuylkill	W. O. Snyder,	Minersville.
Tioga	Arthur Edwards,	Elkland.
Union	J. G. Oberdorf, R. F. D. No. 2,	Mifflinburg.
Venango	Bell Floral Co.,	Franklin.
Wyoming	E. A. Ney,	Eatonville.
York	E. J. Weiser, R. F. D. No. 11,	York.
Ohio.		
	Jones & Kurdelmyer,	Troy, Miami Co.
	Myers Bros. & Co.,	Wilmot, Stark Co.
	C. E. Vernon & Co., 828 N. Main St.,	Dayton.
New York.		
	L. F. Miller,	Ripley.

APIARY INSPECTION

The ravages of American foulbrood and European foulbrood continue unchecked in many sections of the state. Bees are almost wiped out in several of the best beekeeping counties. Both types of foulbrood are spreading rapidly and the beekeeping industry of the entire state is seriously threatened.

Much good has been done with the limited funds for the work, but they have been and are entirely inadequate to meet the situation.

Indiana, Armstrong, Elk, Union and Juniata counties are notable examples for the clean sweep of the disease. Work enough has been done in these counties to determine to some extent the tremendous losses.

Only a few skilled in modern beekeeping have been able to save their bees, and they have done so at a heavy cost. In many districts where a few years ago hundreds of colonies were kept, and good profits made from them, very few are found now. Reports from beekeepers all over the state indicate that this condition is quite general, and unless a larger effort can be made soon the beekeeping industry will be seriously damaged, if not entirely wiped out.

The only effective way to meet the situation is to have enough Apiary Advisors in the field to inspect all colonies of bees in the state every two years, to advise in modern beekeeping, to establish certain quarantine limits and compel the transferring of all bees into modern frame hives.

The introduction of a vigorous strain of Italian bees has been found effective in combating European foulbrood. The American type must have more vigorous treatment, by shaking the bees into a clean hive, and destroying the old and infected combs.

The same plan was followed as reported for 1915. As many beekeepers as possible were visited. Instructions were given for treating diseased colonies, modern beekeeping taught and, where practical, demonstrations were made. To clean up any county or district was impossible.

The work was extended in most counties where service had been given previously, and new work started in Armstrong, Bedford, Clarion, Columbia, Franklin, Luzerne, Northumberland, Somerset and Tioga counties.

The table of statistics shows the work done:

Counties.	Number apairies visited.	Number apairies revisited during season.	Number colonies of which information is gained.	Number colonies carefully examined.	Number colonies found with American Foulbrood.	Number colonies found with European Foulbrood.	Number colonies found with Sacbrood.	Number colonies found with Paralysis.	Number permanent inspectors employed.	Number temporary inspectors employed.	Number of days of service of temporary inspectors.	Per diem temporary inspectors.	Cost of inspection per colony.
Adams,	18	....	296	296	15	....	....	2	1	3	140	$3.00	$.18 8/10.
Allegheny,	3	....	43	43	....	....	....	....	....	....	....	......	....
Armstrong,	17	....	207	207	68	....	....	....	....	....	....	......	....
Bedford,	28	...	371	371	7	6	....	....	....	....	....	......	....
Bucks,	60	2	517	517	....	19	....	....	....	....	....	......	....
Cambria,	2	....	182	182	2	....	....	....	....	....	....	......	....
Centre,	27	....	261	261	25	12	....	....	....	....	....	......	....
Chester,	31	....	772	772	8	....	....	....	....	....	....	......	....
Clarion,	47	....	791	791	4	72	....	2	....	....	....	......	....
Clearfield,	23	4	504	504	20	10	....	....	....	....	....	......	....
Columbia,	1	....	8	8	....	1	....	....	....	....	....	......	....
Cumberland,	1	....	8	8	....	....	....	....	....	....	....	......	....
Delaware,	36	....	509	509	1	3	120	....	....	....	....	......	....
Franklin,	4	....	84	84	....	....	....	....	....	....	....	......	....
Huntingdon,	1	...	9	9	....	1	....	....	....	....	....	......	....
Indiana,	54	...	669	669	154	....	....	....	....	....	....	......	....
Jefferson,	77	....	1,249	1,249	28	47	....	....	....	....	....	......	....
Juniata,	1	....	70	70	....	....	....	....	....	....	....	......	....
Lancaster,	16	....	386	386	....	....	....	....	....	....	....	......	....
Luzerne,	10	....	121	121	1	1	....	....	....	....	....	......	....
Lycoming,	9	....	276	276	....	18	....	1	....	....	....	......	....
Montgomery,	103	....	936	936	12	....	13	....	....	....	....	......	....
Northumberland,	21	....	222	222	3	14	....	....	....	....	....	......	....
Philadelphia,	93	2	918	918	42	14	4	....	....	....	....	......	....
Snyder,	3	....	19	19	....	....	....	....	....	....	....	......	....
Somerset,	21	....	207	207	25	....	....	....	....	....	....	......	....
Tioga,	1	....	117	117	50	....	....	....	....	....	....	......	....
Union,	7	....	124	124	....	2	....	....	....	....	....	......	....
Westmoreland,	12	....	110	110	14	....	....	....	....	....	....	......	....
Total,	727	8	9,986	9,986	479	220	137	5	1	3	140		

REPORT OF THE BUREAU OF CHEMISTRY

The work performed by the Bureau of Chemistry during the year 1916 has consisted as heretofore of the administrative duties and chemical analyses of the products, samples of which were secured by Agents of the Department in enforcing the control laws regulating the sale of feeding stuffs, fertilizers, linseed oil, seeds, paint, putty, turpentine and lime. In addition to this, a few miscellaneous samples were analyzed together with a number of samples of feeding stuffs submitted with 1916 registration. The number of samples received during the year of each class of materials which were analyzed, with the exception of a few samples of paint, are as follows: Official samples of feeding stuffs 1148; special samples of feeding stuffs 263; fertilizers 684; official samples of linseed oil 41; special samples of linseed oil 1; official samples of seeds 323; special samples of seeds 173; paint 68; turpentine 59; official samples of lime 163; special samples of lime 41; miscellaneous samples 80; making a total of 3,044.

The number of official samples of the products received during the year has been regulated by the amount of moneys appropriated for the respective lines of work. Under the direction of the General Agent, Mr. G. G. Hutchison, the agents regularly employed by the Department, secured the samples for analysis from dealers throughout the State, from such stock as were being offered for sale. In many cases where the labeling appeared to be properly given and there was no apparent violation of the law, in order to avoid duplication, no samples were taken.

In the case of the feeding stuffs work, Special Agents visited 310 towns and cities in 65 counties in securing the 1148 samples received. All of these were analyzed for moisture, protein, fat and fiber and examined microscopically to determine whether or not the ingredients claimed were present and for the purpose of detecting any evidence of the addition or use of adulterants or prohibited products. From time to time, as the work was completed, reports were made showing the detailed analysis of each sample to the Secretary of Agriculture and to Manufacturers and Dealers. The sending out of these reports, as has been our custom for a number of years, has aided materially in bringing the producers and the Department closer together with respect to complying with the requirements of the law. Where discrepencies were noted, the producer's attention was called to these cases and replies were received in nearly all instances advising that the requirements would be complied with.

At the time of sampling, the agents submitted a special report for each sample giving the information found upon sacks or attached cards and this data was also included in the reports referred to. The character of the feeding stuffs sold in the State during the past year has remained good with the exception of Cotton Seed Meals. Thirty per cent. of the samples received were found to be deficient in protein and to contain excessive amounts of cotton seed hulls. We are told that the inferior quality of many shipments of Cotton Seed Meal or the failure in this product to meet the guarantees upon analysis, has been due to the fact that a greater proportion than usual of the lint, great quantities of which are used in making war munitions, has been removed from the hull of the seed thus making it difficult in the manufacture of meal to remove as much of the hull as formerly, which has a tendency to reduce the protein content. This condition, however, is not altogether borne out by the facts, as many of the samples of meals received over-ran the guarantees for protein, and from what information we have on this subject, it is possible to regulate the protein content of meals and thus, when desired, ship out this product fully up to the guarantees claimed. Some of the deficiencies were excessive thus causing the consumers considerable loss as the price of Cotton Seed Meal during the past season has reached the maximum. In many of these cases prosecutions were instituted, fines being paid and in a few cases the manufacturers refunded the dealers an amount calculated on the basis of the selling price and the difference between the protein found and guaranteed. In the early part of the year, complaints were received from the Feed Dealers' Association of Philadelphia to the effect that certain grades of feeding stuffs were being disposed of which were damaged. The General Agent caused an investigation to be made and the City of Philadelphia was thoroughly canvassed and nearly 100 samples of feeds secured and sent in for examination. As a result of this work it was discovered that in a few cases certain shipments of Molasses Feeds had become damaged. The cause of the conditions of these shipments was due to the fact that inferior molasses had been used in their preparation which caused fermentation. Some delay in transit because of freight congestion was also a factor which did not help the situation. In a number of these cases the Manufacturers, who were immediately notified, arranged to remove the feed from sale and to exchange it for feed that was in proper condition for use. During this period also, the General Agent and the Chief Chemist accepted invitations from the Feed Dealers' Association of Philadelphia to attend their annual meeting, to talk over and discuss matters pertaining to the feed situation in general. Much good resulted from this meeting as the dealers were thoroughly in accord with the work the Department is doing in enforcing the Feed Law and voiced their hearty co-operation in the work. It is felt that a great deal of good has also resulted from the investigation made as a result of the complaint above referred to, by making a special study of the character of the feeds sold in Philadelphia. No complaints have been received since that time. The general character of the Dairy and Stock Mixed Feeds sold in the State during the year, has remained of a high character although there were a few cases where deficiencies occurred and where these feeds were not entirely free from weed seeds. A feed which is being more and more used, namely, the by-product from the cleaning of tin plate commonly known as "Palm Oil Middlings," was represented by the samples received. This material possesses considerable feeding value and merrit and as the manufacturers have installed machines for the removal of slugs and slivers of tin, it can be safely fed. The Association of Feed Control Officials of the United States appointed a Committee consisting of the Chemist of the Massachusetts Agricultural Experiment Station and of this Bureau to make a study of the value of Refuse Middlings as a feed. The State Live Stock Sanitary Board co-operated in feeding some of this product in their Laboratory at Philadelphia. As a result of these feeding experiments and the analysis of samples, it was decided that where machines were used for the removal of foreign material, and as the product would then only contain traces of tin, it could with safety be utilized for feeding purposes. Two samples of a grade of this product, however, were received in which small amounts of ground corn cobs were found present and it was necessary to bring action against the dealers, as corn cobs are prohibited from being used. Several samples of Molasses Feeds were found to contain traces and small amounts of whole weed seeds. In this class of products the number of samples in which whole weed seeds in large quantities are present, has decreased over the number received during previous years. The absence of large quantities of whole weed seeds is due to the pulverizing into the form of meal the by-product, Grain Screenings, which is used to a large extent in the mixing of these feeds. The character of the poultry foods sold during the year has also improved as only six samples of the 143 of this grade of feeds examined were found to contain large amounts of whole weed seeds. About one-fourth of them, however, did contain traces and small amounts of small whole weed seeds. One sample of Swine Feed was received in which a product called "Humus" or "Peat" was used as an ingredient. As this material was considered to have practically no feeding value whatever, objection was made to its sale and the manufacturers, upon request, agreed to discontinue its use in feeds sold in Pennsylvania. More uniformity in the guaranteeing and labeling of animal by-products is being observed. Several samples were found deficient in protein and to contain bone in such amounts as to class these samples as "Meat and Bone Scraps" instead of being classed as "Meat Scraps." A Committee of the Feed Control Officials Association of which the Chief Chemist is a member, as a result of considerable experimental work, adopted a standard for this product and hereafter, therefore, when the content of Bone is such as to cause the Phosphoric Acid to exceed 10% they will be labeled "Meat and Bone Scraps." The protein in such grades of meat and bone products will not usually exceed 45%.

During the year, at the direction of the Secretary of Agriculture, 40 prosecutions were ordered and the General Agent was instructed to make information in these cases, which was accordingly done. In a few of these cases ordered, subsequent investigation did not warrant the Department pressing the same for the payment of fines. It was only necessary to attend a few hearings. Fines were paid in 17 cases and of the remaining number several were adjusted without payment of fines but by payment of costs, as the parties responsible for the violations agreed to comply with the requirements. The fines and costs received amounted to $878.92 which were paid to the State Treasurer, from time to time, as they were received. Of the number of cases ordered prosecuted, 16 were ordered after the first of January 1917, informations having been made which are still pending, together with 3 other cases. Four cases were adjusted by payment of costs. One case, however, which involves the sale of Wheat Screenings containing a large amount of whole weed seeds, was held over for Court and is still pending.

The special samples of feeding stuffs submitted to the Department by residents of the State and which numbered 263, were all analyzed as required and reports of the results received were submitted to the senders. The fees which were received for this work amounting to $263 were paid to the State Treasurer, from time to time, as required. These samples are submitted especially for the purpose of determining whether certain shipments will, upon analysis, meet the guarantees claimed, and where new brands of feeds are to be placed on sale, from the results of analyses in such cases, guarantees can be established and the feeds registered. Because of the fact that many of these samples are only preliminary mixtures and do not represent the final product in cases where no feeds are being introduced, or where changes are made in formulas, the results of analyses are not published in the annual Feeding Stuffs Reports.

During the year there were 532 registrations for feeding stuffs received covering 2318 kinds and brands of feeding stuffs. Of this number, there were 1527 products having distinct brand or proprietary names. In many cases where registrations were submitted, requests were made for samples representing the brands listed in order that the Bureau might make an examination of them to determine whether they contained prohibited materials, such as weed seeds. In those samples where weed seeds or other undesirable products were included, registrations were refused, or, if, as happened in most of these cases, the manufacturers changed the formula to comply with the requirements; registrations were subsequently placed on file. The use of the so called "sliding guarantees" for protein, fat and fiber, has materially decreased, as a result of the stand taken by the Department against this method of guaranteeing. The majority of feeds, therefore, now being sold in the State are labeled with minimum guarantees for protein and fat and maximum guarantees for fiber, which are much less misleading and more truly represent the products. Several registrations were refused for the sale of Cotton Seed Meals running low in protein and containing excessive amounts of Cotton Seed Hulls, which would make the fiber content in excess of 10%, the amount permitted. In several of these cases, where objections were made to such class of products, the producers arranged to sell the same as Cotton Seed Feeds which are permitted to be sold under the law with a statement showing that they were composed of Cotton Seed Meal and Cotton Seed Hulls. In addition to "Humus" or "Peat" already referred to, registrations for feeding stuffs containing "Vegetable Meal," a garbage tankage product, were also refused for the reason that samples examined were found to contain small particles of glass. The Feed Control Officials, in considering a definition for this product, have not as yet adopted one as the process of preparing garbage tankage for use as a feed has not been perfected, to the extent of eliminating foreign materials. A few registrations were also refused where feeds containing Oat Hulls showed a maximum guarantee for fiber in excess of 9%, the amount permitted. In a number of such feeds found being sold during the year, the content of fiber, upon analysis, slightly exceeded the amount permitted although the sacks were labeled to show considerably more fiber than actually found. In this connection it might be well to here suggest that if any contemplated changes are to be made in the Feeding Stuffs Law in the future, the matter of restricting fiber in feeds containing certain materials should be carefully considered, with the view of making the law uniform in this respect. For example, feeds containing Oat Hulls are now restricted to 9% of crude fiber, whereas those containing Clipped Oat By-Product, a product very closely resembling Oat Hulls, can be used without any restriction as to the fiber content. This case is also true where other materials are used containing about the same amount of fiber. The prices charged for the feeds sold during the past year have materially increased for nearly every class over those prevailing during 1915. In addition to the advance in prices, some difficulty has been experienced in consumers receiving shipments of feeds promptly, due to traffic conditions.

A report will be prepared for 1916 showing the results of the analyses of the samples of Feeding Stuffs secured during this period in which will be found the results in detail and which cannot be included in a report of this kind.

The work of analyzing the samples of fertilizers secured during the Fall inspection was transferred from the Laboratory of the State Experiment Station to this Bureau. During this period there were 896 samples received from the official sampling agents, and of this number 684 samples representing brands registered with the Department were analyzed. Determinations were made for Moisture, Nitrogen in its various form, Total Insoluble and Available Phosphoric Acid and Water Soluble Potash, in those brands where these plant foods were guaranteed. A change was made in the method of securing the samples from the use of small glass bottles to large cartons thus providing a sufficient amount of sample for making duplicate determinations and submitting samples in contested cases to manufacturers when required. Reports of the results secured, in addition to being submitted to the Secretary of Agriculture, were reported to the manufacturers or importers responsible for the sale of the brands represented. In the case of the fertilizers furnishing nitrogen, microscopical examination was made for the presence of leather, hair, hoof, horn or wool waste, which when used are required to be shown on the sacks or attached cards. In no case were any of these materials found present except in one case where a slight trace of wool waste was noted.

There were 414 distinct brands of fertilizers, the output of 79 companies represented by the samples analyzed. The largest proportion of these samples were complete fertilizers which showed a considerable variation in their formula. The 1-8-1 formula formed the greater portion of the mixed fertilizers being sold in the State. There was considerable variation noted in the selling prices for the various brands and even in samples represented by those having the same formula. As a result of the unsettled condition of the markets and especially as the price of potash has reached the highest figure ever known, no attempt has been made to give a valuation, as has been the usual custom, for the samples of fertilizers examined. Owing to the great variation noted, not only in the various brands, but in the selling prices of similar or fertilizers having like formulas, it appears that an attempt to give valuations is inaccurate and misleading. The samples, as a rule, met their guarantees, the number of deficiencies being small. In estimating the number of samples deficient in the plant foods guaranteed, only those cases were noted where the percentages found were .2 per cent. or more below their guarantees, and in cases where the guarantees for nitrogen and potash were .50 per cent. or less, the deficiencies noted were only where variations of 1. per cent. or more below existed. Of the total number of samples examined, only 12 were deficient in nitrogen, 41 deficient in available phosphoric acid and 9 in potash. The average results secured upon analysis of the various classes, together with their retail prices were as follows: Complete Fertilizers, nitrogen 1.29%; available phosphoric acid, 9.07%; potash 1.32%, price $24.94. Nitrogen and Phosphoric Acid Fertilizers, nitrogen 1.46%; available phosphoric acid 10.18%, price $21.83. Ground Bone Fertilizers, nitrogen 2.94%; total phosphoric acid 23.11%; price $37.45. Acidulated Phosphate Fertilizers, available phosphoric acid 15.28%; price $18.46. Potash and Rock Fertilizers, available phosphoric acid 9.38%; potash 1.60%; price $21.62.

A report has been prepared covering the inspection work of the Fall season from August 1st to December 31st, in which will be found the detailed report of the results of analyses.

In making preparation for the carrying out of the work necessary in analyzing the samples received during the Fall inspection, supplies and equipment were purchased and three additional chemists employed which were transferred from the Laboratory of the State Experiment Station where they had had experience in this line of work. A new Laboratory Assistant was also employed. It was also necessary, in order to complete the work in the time required, to assign a portion of the work to two of the assistants regularly employed on other lines of work, thus delaying the analyses of other products until such a time as the fertilizer work had been completed. In order that we might be as proficient and that the work assigned done at the least possible cost, arrangements have been made to recover the molyblic acid necessary in determining phosphoric acid, which is one of the high priced chemicals used in this work.

In carrying out the provisions regulating the sale of Linseed Oil, 41 samples were received during the year, 2 of which were found to be adulterated with mineral oil. The analysis of these samples, however, were not completed until after the close of the year covered by this report. The prosecutions were placed in the hands of the General Agent, infomations being made as directed and the cases are now pending. It is believed, however, that these cases will be adjusted by payment of fines. Under the provisions of the law, providing for the analysis of special samples for the fee of $1.00, only one such sample was received. The analyses was made accordingly and the fee received and paid to the State Treasurer as required.

The enforcement of the law regulating the sale of agricultural seeds has become quite popular and has been of real service to the consumers of seeds throughout the State. During the year, Special Agents sent in 323 samples, all of which were carefully tested for purity, determinations being made for Pure Seeds, Foreign Seeds, Inert Matter and examined with respect to their feeedom from Canada Thistle and Dodder. A few of the official samples of seeds were found to be less than the standard of purity required, however, the majority of them exceeded the standards. In the more important seeds where a large number of each kind were examined, the following averages for pure seeds were found: Red Clover 98.34%, Crimson Clover 98.13%, Alfalfa 99.46%, Timothy 99.06%, Alsike Clover 97.47%. The results of the analyses of these official samples were reported to the seed growers and to the dealers frcm whom they were secured. In accordance with the proviso in the Seed Law for the analysis of special samples for the fee of 25 cents each, 173 special samples were received and tested. The results secured were, as soon as posible, reported to the senders and the fees received amounting to $43.25 were paid to the State Treasurer as required. These samples were, in many cases, submitted for the purpose of determining whether or not the seed was of the proper degree of purity to be offered for sale. An average, however, of the results secured exceeded the standards of purity required, although in a number of cases the samples were deficient and these cases were so reported in order that the growers or dealers might arrange to have the seeds cleaned from foreign seeds and thus come within the requirements of the Law. A Seed Report for 1916 will be prepared in which the detailed results of the analyses will be found.

In endeavoring to enforce the provisions of the law regulating the sale of Paint, Putty and Turpentine, Special Agents of the Department secured during the year 68 samples of Paint and 59 samples of Turpentine. Because of the interference with the other lines of work and the lack of sufficient appropriation to properly enforce this Law, the analyses of a portion of these samples were delayed until after the close of the year. The work thus far accomplished, however, shows the need of this Law as 50 per cent of the samples of Turpentine examined were found to be adulterated. Of the samples of Paint thus far examined, several were found to be misbranded, as some of the white leads which were found to contain barytes as an extender, were not labeled "compound" as required. As the law does not apply to those paints which were upon the shelves of the dealers at the time the same became effective, it is to be expected that such samples will be found not labeled as required. It is believed, however, that the manufacturers are making every effort to comply with the rulings issued in a circular letter previous to the taking effect of this law and as agreed to at a conference held in November 1915. Early in the year our General Agent and the Chief Chemist attended a conference with the Paint Manufacturers' Association in Philadelphia relative to the enforcement of the Paint Law. The various requirements of the law were considered and explained and it is believed much good resulted from this meeting. All of the large manufacturers were represented and took part in the discussions and gave their assurance that they would co-operate in every way with the Department in enforcing the provisions of this Act. A report will be prepared showing the nature of the work done in the analysis of the samples received.

In carrying out the provisions of the law regulating the sale of Lime products which became effective the first of the year, 163 samples were received from authorized sampling agents representing brands registered with the Department. All of these samples were analyzed and reports of the results secured and submitted to the Secretary of Agriculture, producers and dealers. A number of samples were secured which were not analyzed for the reason that the brands were not registered. The classes of lime products, together with the number of samples in each, were as follows: Pulverized Limestone 31; Artificial Carbonate of Lime 21; Marl 6; Hydrated Lime 72; Gypsum or Land Plaster 4, Miscellaneous 1. The analyses of these products consisted in making determinations for calcium oxide, magnesium oxide and insoluble matter. In the case of Gypsum or Land Plaster, determinations were made for sulphur trioxide. In the case of Pulverized Lime-stones and Artificial Carbonates of Lime, the samples were subjected to the process of sieving to determine what portions would pass a No. 10, No. 50 and No. 100 mesh sieve. The Lime Law provides for the analysis of special samples for the fee of $1.00 and during the year covered by this report, 41 such samples were received, the fees amounting to $41.00 being paid to the State Treasurer as required. The reports were sent out to those submitting these samples as soon as possible after the work had been completed. A bulletin has been prepared showing the results of the analyses of the samples received during the Spring and Fall inspection seasons.

In co-operating with other Departments of the State government and in the examination of materials necessary in co-operative work, 80 miscellaneous samples were analyzed during the year which included Fertilizers, Feeds, Seeds, Linseed Oil, Paint, Lime and Soils. In the case of Linseed Oil and Turpentine, it is an easy matter to determine by preliminary tests whether these products are adulterated, without the necessity of making the usual chemical analysis required. In order that the Department may be of as much service as possible to the consumers of these products, we have signified our willingness to make these preliminary examinations of Linseed Oil and Turpentine free of charge. In the case of Linseed Oil, if it should develop that the sample is adulterated, a complete analysis can then be had by the party interested submitting the fee required. A few of such samples were examined in this way and included in the number classed as "Miscellaneous." In the Spring the Bureau took part in the Reading Fair by making an exhibit of the various samples of materials analyzed which was in charge of the General Agent and one of our Assistants. Considerable time was devoted to preparing this exhibit and making the work of interest to visitors of the Fair.

In accomplishing the work of this Bureau, as indicated by the foregoing data, a considerable amount of clerical work is required in making out reports of analyses and preparing the annual reports or bulletins and much time and care, therefore, has been given to this work to insure completeness and accuracy. Heretofore separate reports have been mailed to manufacturers and dealers, however, in order that time may be saved, it is planned to change the method of making reports whereby carbon copies of reports can be mailed to producers and dealers. During the first part of the year, reports of the work of 1915 were prepared and mailed to those names on the mailing lists by the Bureau of Distribution of Documents. These reports were as follows: "Feeding Stuffs Report for 1915." "Linseed Oil Report for 1915," and "Seed Report for 1915." In December the requests for 1917 Feeding Stuffs registrations were mailed to manufacturers as is the usual custom. As previously referred to, the number of samples of each class of products analyzed has been, to a large extent, regulated by the moneys appropriated for the several lines of work. This will explain why it happens that so few samples of Linseed Oil and Paint and Turpentine were examined as compared with those of Feeding Stuffs and Fertilizers. The appropriations for the enforcement of the Paint and Oil Laws are entirely inadequate to properly protect the consumers in the State using these commodities. The price of chemicals has advanced owing to the European situation, and the general advance of prices has, of course, increased the cost of doing the various lines of chemical work. It is hoped that the 1917 session of the Legislature will understand the needs of the Bureau and provide funds which will enable the Department to enforce the various control laws, under which we are working, in a manner which will be of benefit to those directly affected by the use of these several commodities.

It has been fortunate that we have not been called upon to attend many hearings where prosecutions for violation of the laws were ordered. This situation has been due to the able manner in which our General Agent, who has charge of this end of the work, has performed his duties. Acknowledgement is made and many thanks extended to each member of the Bureau Staff who have faithfully attended to their work which they have been called upon to perform.

J. W. KELLOGG,
Chief Chemist.

REPORT OF STATE VETERINARIAN AND STATE LIVESTOCK SANITARY BOARD FOR 1916.

Harrisburg, Pa., December 31, 1916.

Hon. Chas. E. Patton, Secretary of Agriculture:

Dear Sir: I have the honor to submit herewith the report of the Bureau of Veterinary Science and State Livestock Sanitary Board for 1916.

MEAT HYGIENE

About 85% of the livestock slaughtered in the Commonwealth are handled through the four principal stockyards, namely: Pittsburgh, Lancaster, Philadelphia and Greencastle. In order to do the best work with a limited number of agents, an antemortem examination is made of all the animals at the above mentioned stockyards. Animals that are injured, crippled or commonly called "Downers," those affected with any disease or condition that may cause their condemnation on post mortem examination are marked "quarantined," and the owners are required to have them slaughtered under official supervision. It frequently occurs that a physical or an antemortem examination proves negative and on post mortem, disease is found to such an extent that the meat is not fit for human consumption.

About fifty per cent. of the meat consumed in Pennsylvania is slaughtered under Federal, State or Municipal inspection. It is impossible for the small force maintained by the State to supervise the slaughter of the other half. Great care is exercised by the buyers for establishments having continuous inspection and the result is that the rejected animals and those that the dealer believes would be condemned under official supervision are bought and slaughtered by those that do not have to slaughter them under Federal or Municipal inspection. Fortunately, this class of butchers is small, but they exist in each district and our agents give them more attention than those that kill the better grades. A certain percentage of the meat and meat food products offered for sale and sold in the Commonwealth would be condemned if it was possible to examine it before it was placed on the market. We again urge cities, boroughs and first class townships to establish their own local inspection.

The campaign started last year in reference to having all meat and meat food products protected against handling, touching by unauthorized persons and against insects was continued this year and not less than 80% of the establishments are satisfactorily equipped. These good results have been accomplished by the efficient work of the agents and the co-operation of those engaged in the meat business.

When an establishment is found defective, a written notice specifying the defects is given the owner. In addition to a copy of the rules and regulations, our agent gives the owner of the establishment advice as to how the defects may be abolished that the meat and meat food products prepared and offered for sale are produced in a sanitary manner. The establishment is again visited in a short time and if the defects are not abolished and the owner has made little or no effort to clean up or repair his establishment, he is then given a specified time. As a rule, thirty days are given unless the conditions are such as to affect the unwholesomeness of the meat and meat food products prepared or offered for sale. Upon receipt of the agent's report and his recommendation, the Board then decides on a specified number of days in which the defects must be abolished. At the expiration of the specified time if the owner does not comply, the establishment is closed. During the year it was found necessary to close fifty-two (52) establishments. The Board has revoked the order to close on a small number of these establishments after the owners complied with the law, rules and regulations.

The following tables show the number of establishments, animals and products examined during the year:

Counties.	MEAT MARKETS.				SLAUGHTER HOUSES.			
	Number Examined.	Number Defective, First Examination.	Number Defective, Second Examination.	Number Closed.	Number Examined.	Number Defective, First Examination.	Number Defective, Second Examination.	Number Closed.
Adams,	52	12	2	0	65	10	1	1
Allegheny,	1,722	601	332	4	79	18	7	0
Armstrong,	85	16	7	1	66	17	16	2
Beaver,	316	89	79	0	38	10	5	0
Bedford,	71	19	18	1	129	52	22	3
Berks,	21	1	1	0	70	2	1	0
Blair,	748	206	108	1	177	33	9	1
Bradford,	18	0	0	0	24	5	4	0
Bucks,	53	11	11	0	49	12	9	0
Butler,	145	48	83	0	38	8	8	1
Cambria,	460	93	120	2	97	21	11	1
Cameron,	32	16	8	0	1	1	0	0
Carbon,	21	0	0	0	7	0	0	0
Centre,	37	6	5	0	19	10	5	0
Chester,	127	85	23	4	13	3	1	0
Clarion,	26	4	0	0	24	10	4	0
Clearfield,	107	59	22	0	24	8	1	0
Clinton,	68	12	7	0	1	0	0	0
Columbia,	168	28	10	0	11	1	1	0
Crawford,	16	2	0	0	4	0	0	0
Cumberland,	229	86	14	0	145	17	8	0
Dauphin,	109	20	7	2	83	17	2	0
Delaware,	494	151	94	0	15	3	1	0
Elk,	43	11	11	0	0	0	0	0
Erie,	11	0	0	0	11	0	0	0
Fayette,	217	33	15	0	44	13	4	1
Forest,	0	0	0	0	0	0	0	0
Franklin,	98	20	0	0	64	11	1	0
Fulton,	3	0	0	0	3	0	0	0
Greene,	34	11	1	0	18	7	5	0
Huntingdon,	77	25	12	0	35	17	5	0
Indiana,	129	28	9	0	30	14	6	0
Jefferson,	181	31	6	0	15	5	2	0
Juniata,	3	0	0	0	4	0	0	0
Lackawanna,	3	1	1	0	0	0	0	0
Lancaster,	452	67	30	2	518	69	40	8
Lawrence,	184	51	32	0	32	8	6	0

Counties.	MEAT MARKETS.				SLAUGHTER HOUSES.			
	Number Examined.	Number Defective, First Examination.	Number Defective, Second Examination.	Number Closed.	Number Examined.	Number Defective, First Examination.	Number Defective, Second Examination.	Number Closed.
Lebanon,	158	24	8	0	170	30	7	1
Lehigh,	68	6	4	0	33	3	2	0
Luzerne,	111	67	27	0	12	4	1	1
Lycoming,	110	27	0	0	24	8	0	0
McKean,	43	8	0	0	9	1	0	0
Mercer,	1	0	0	0	3	0	0	0
Mifflin,	15	9	1	0	10	5	1	0
Monroe,	0	0	0	0	0	0	0	0
Montgomery,	264	43	21	1	90	15	5	0
Montour,	76	16	10	0	2	0	0	0
Northampton,	144	26	25	1	37	5	3	0
Northumberland,	616	70	37	1	96	6	2	0
Perry,	76	34	11	0	50	9	7	0
Philadelphia,	0	0	0	0	1	0	0	0
Pike,	2	0	0	0	0	0	0	0
Potter,	11	0	0	0	10	3	0	0
Schuylkill,	261	23	18	1	51	6	2	1
Snyder,	20	2	1	0	28	9	0	0
Somerset,	144	45	33	0	79	23	12	0
Sullivan,	11	0	0	0	15	4	3	0
Susquehanna,	13	1	1	0	6	1	0	0
Tioga,	51	15	3	0	26	1	0	0
Union,	30	5	3	0	25	4	3	1
Venango,	1	0	0	0	0	0	0	0
Warren,	0	0	0	0	0	0	0	0
Washington,	365	51	19	0	41	8	2	0
Wayne,	1	1	0	0	0	0	0	0
Westmoreland,	350	96	66	1	62	13	6	0
Wyoming,	1	1	0	0	0	0	0	0
York,	494	65	49	4	494	122	73	4
Total,	9,997	2,430	1,355	26	3,327	681	314	26

*Slaughter houses and meat markets in Allegheny County outside of Pittsburgh. No general examination was made of slaughter houses and meat markets in Philadelphia, Reading, Harrisburg, Ellwood City, Bristol, Phoenixville and Nanticoke.

CARCASSES EXAMINED AT MEAT MARKETS, MARKET HOUSES, SLAUGHTERING AND STORAGE ESTABLISHMENTS.

Class of Animals.	Passed	Condemned.	Total.
Cattle,	23,799	107	23,816
Sheep,	8,905	13	8,918
Swine,	11,133	24	11,157
Total,	43,837	144	43,891

ANTE-MORTEM INSPECTION OF ANIMALS.

Class of Animals.	Passed.	Quarantined.*	Total.
Cattle,	374,737	4,677	379,414
Sheep,	423,299	481	423,780
Swine,	1,006,062	2,289	1,008,351
Total,	1,804,098	7,447	1,811,545

*Held for further examination. Those examined on post mortem included in following table.

POST MORTEM INSPECTION OF ANIMALS.

Class of Animals.	Passed	Condemned.	Total.
Cattle,	3,374	403	3,777
Sheep,	251	19	270
Swine,	1,781	252	2,033
Total,	5,406	674	6,080

REPORT OF PRODUCTS.

	Passed	Condemned.	Total.
	Lbs.	Lbs.	Lbs.
Fresh and dried meats,	2,717,783	12,893	2,730,676
Organs,	46,466	7,108	53,574

HORSE BREEDING

The number of stallions licensed in Pennsylvania in 1916 was 2,049. This is 209 less than in 1915. Thirty-six of this number were purebreds and the balance were non-registered. The Percherons lead all other purebreds by about three to one. There were 542 licensed in 1916. The next most poular breed was the Standardbreds with 175 licensed. From a geographical point of view, Westmoreland county has the largest number of purebreds as well as grades or non-registered stallions. This county has 60 purebreds and 27 unregistered stallions licensed. Crawford and Chester counties stand second and third. There were but five Jacks licensed in the State.

There were 21,126,000 horses and 4,639,000 mules in the United States January 1, 1917. The estimated price per head was $102.94 for horses and $118.32 for mules. This is an average gain per head for the year of $1.34 on horses and $4.49 on mules. We shipped 1,029,961 horses and mules from this country to the European War up to December 1, 1916. The price varied according to size and type. Cavalry horses average in weight from 1,000 to 1,100 pounds. The maximum price to the farmer for such horses is $115 per head. The English Government allows for artillery horses weighing from 1200 to 1500 pounds $160 and $240 per head for those weighing 1650 pounds and over. The French government allows $140 to $160 for the same weight horse. The British government allows for mules graded according to size the following prices:—

14 to 14½ hands high,	$75 to $125,
15 to 15½ hands high,	$175 to $225,
16 to 16½ hands high,	$200 to $275.

Most of the horses and mules purchased for the war were from the Middle West. The heavy horses and the large mules have been especially useful in the war.

More concerted and individual attention should be given to horse breeding in Pennsylvania. There are not enough horses raised here to supply our own markets. We have plenty of stallions and some of the best. Sixteen different breeds and many high class grades are owned in the State. The interest in breeding draft horses has increased wonderfully during the past few years. The type of mares are better now than formerly. We have more draft grade mares but few purebreds. The demand recently has been for heavy horses and it is more than likely that this will continue. There is a general opinion, among those best qualified to judge, that the price and demand for horses will increase materially in the next few years as a result of the extensive shipments abroad in the past two years. The farmers in the State should try to raise horses and mules enough at least for their own use and to do this they must raise many more than they have in the past. It is doubtful whether the farm tractor will ever be as useful as the horse or as economical on our average Pennsylvania farms.

The Percheron horse, which has made a remarkably good record in the present war, was developed in the rural portions of France. He has evidently absorbed much of the spirit and staying qualities of the French people. The French government has assisted its people wonderfully in horse breeding; but the farmers themselves are entitled to the greatest part of the credit. The government furnishes the stallion. Each farmer keeps a good purebred brood mare or enough to do his farm work. They are bred each year and every farmer in this particular section breeds only Percherons. In other sections the same careful attention is given to breeding thoroughbreds or some other worthy breed. With good care and good food the colt is kept growing. He does not loose his milk fat till he reaches maturity. A colt raised in this way makes a most valuable horse. In a good horse country one seldom sees a long haired, pot bellied colt, or one of inferior breed, quality or conformation. Neither the good stallions nor the desirable brood mares are being used by foreign countries in the war. They are getting rid of those that are undesirable for breeding purposes in this way but they are too wise to sacrifice their best horses in war. They have kept on breeding and as soon as the war is over will have as many good horses as ever to ship to us and there is every prospect that we will need them as much in the future as we have in the past.

Our people are not giving too much attention to breeding dairy cattle, sheep or swine yet there appears to be more interest along these lines than is shown in horse breeding. The horse has done his share in making this country what it is today. His work is finished by no means. Nothing speaks better for a good farmer or is more useful to him than a pair of well groomed, well fed, well broken, well bred horses. Those he raises are more companionable and should be most desirable in every way.

Iowa has taken the lead of all other states in horse breeding. It is one of the most profitable branches of animal husbandry in that State.

Motor trucks, farm tractors and other forms of machine drawn vehicles have replaced the horse in many lines of work. The prospects have been discouraging to those interested in horses. The machines have come to stay and they have their place. The horse has his place also and must be included in our plans for handling commerce and doing work in the future. He has his place in war, and among all the wonderful inventions of modern warfare nothing has been found that can fill his place. Without horses an army would be helplessly handicapped. It is the same with agriculture and other peaceful occupations.

Most of the foreign countries are far ahead of us in horse breeding. They have all demonstrated what can be done by an intelligent and constant application of the well known principles of breeding. This has been demonstrated by the Clydes in Scotland, the Shires in England, the Percherons in France, and the Belgians in Belgium. Iowa has demonstrated that successful horse breeding can be profitably conducted in this country.

Stallion owners have done and are doing about all that can be expected of them. It might be best for the horse breeding interests of the state if all were compelled to use one breed of horses and everybody do his best to develop this particular breed. This is practically what has been done in countries where our best breeds originated. It is doubtful if this plan could ever be worked successfully in a free country. Those interested in horse breeding should have an ideal and stick to it for years. As a class mare owners are fickle. They will breed to a light road horse one year or generation and to a heavy draft type the next. Another fault that is observed with mare owners is that too many of them breed overworked, underfed, old, crippled or unsound mares. To produce the best get the dam and sire must be of the same general type. Each must be sound, strong and vigorous and receive good care. Breeding counts just as much in the dam as it does in the sire. Both are better if given a reasonable amount of work. A good mare can do her part of the work on a farm and raise a colt every year. It is not necessary for her to be idle for more than two weeks during her foaling period. She can begin breeding at three years of age and continue for fifteen years or more.

We trust that much more attention will be given to horse breeding in Pennsylvania in the future than has been shown in the past.

A stallion registration law has been in operation in Pennsylvania since 1907. Many other states have adopted somewhat similar laws. No state has a law that is more just or one that has been conducted with less friction. Much of the credit for the wise provisions in the law and the justice of its enforcement in the past was due to the efforts of Carl W. Gay, who had charge of this work for the Board up to last year. In August of 1916 he resigned from this service to accept a position as Professor of Animal Husbandry and Chairman of Animal Industry Group at the University of Minnesota. Since his resignation the work has been conducted along the same practical lines from the Harrisburg office. We all feel under a deep debt of gratitude to Dr. Gay for the faithful, efficient service rendered to horse breeding in Pennsylvania, and wish him continued success in his new and responsible position.

TABLE SHOWING NUMBER AND CLASSES OF LICENSES ISSUED IN PENNSYLVANIA FROM 1908 to 1916, INCLUSIVE.

Year.	Registered.	Unregistered.	Total Number Licensed.
1908,	666	1,350	2,016
1909,	823	1,427	2,250
1910,	908	1,477	2,385
1911,	951	1,480	2,431
1912,	954	1,390	2,344
1913,	981	1,332	2,313
1914,	1,029	1,327	2,356
1915,	1,048	1,210	2,258
1916,	1,012	1,037	2,049

A COMPARATIVE NINE YEAR TABLE SHOWING THE NUMBER OF REGISTERED STALLIONS OF EACH BREED LICENSED IN PENNSYLVANIA.

Breed.	1908	1909	1910	1911	1912	1913	1914	1915	1916
Percheron,	252	290	315	354	372	416	459	518	542
Standardbred,	209	253	289	293	267	266	248	211	173
Non-standardbred,	......	......	......	......	......	......	8	5	2
Belgian,	35	48	66	70	74	90	108	124	123
Shire,	33	43	43	44	35	30	29	30	27
German Coach,	23	36	46	40	40	36	31	33	26
French Draft,	29	33	20	30	31	34	38	31	20
Hackney,	23	29	26	29	23	27	28	22	26
Clydesdale,	19	30	33	26	23	20	22	20	18
French Coach,	15	24	25	25	14	8	10	8	8
Thoroughbred,	5	10	10	12	11	14	13	14	15
Morgan,	11	11	9	13	11	13	12	10	8
Saddle,	5	6	7	5	8	8	8	10	11
Cleveland Bay,	3	5	3	2	2	2	2	1	......
Shetland,	3	2	3	2	3	3	9	5	8
Suffolk,	......	1	1	1	1	......	......	......	......
Yorkshire,	1	1	1	1	......	......	......	......	......
Orloff,	......	1	1	1	......	......	......	......	......
Welsh,	......	......	1	1	......	......	......	......	......
Arabian,	......	......	......	1	1	1	......	......	......
Jack,	......	......	......	1	2	2	4	6	5
Totals,	666	823	908	951	923	978	1,029	1,048	1,012

A COMPARATIVE TABLE OF THE NUMBER OF STALLIONS LICENSED AND THE NUMBER AND KIND OF CERTIFICATES ISSUED IN EACH COUNTY OF PENNSYLVANIA—1916.

Counties.	Very highly commended.	Registered and sound.	Registered but unsound.	Unregistered but sound.	Unregistered and unsound.	Total number of stallions.
Adams,		9		27		36
Allegheny,		14	4	5		23
Armstrong,		27		17	1	45
Beaver,		14		9		23
Bedford,		17	1	37	2	57
Berks,		10	1	27		38
Blair,		8	1	8		17
Bradford,		25		32	3	60
Bucks,		12	1	13		26
Butler,		31	1	7		39
Cambria,		8	1	13	1	23
Cameron,		2				2
Carbon,				3		3
Centre,		7		21		28
Chester,		46	3	34	3	86
Clarion,		37	1	20		58
Clearfield,		12		15		27
Clinton,		11		7		18
Columbia,		2		12		14
Crawford,		52	3	28		83
Cumberland,		11		53	1	65
Dauphin,		5		10		15
Delaware,		12		2		14
Elk,			1	1		2
Erie,		28	1	20		49
Fayette,		21	1	16		38
Forest,				1		1
Franklin,		41	2	50	1	94
Fulton,		6		7		13
Greene,		36	4	9		49
Huntingdon,		8	1	23		32
Indiana,		30	1	19		50
Jefferson,		13		13		26
Juniata,		7		13		20
Lackawanna,		4		5		9
Lancaster,		14	1	31		46
Lawrence,		37		8		45
Lebanon,		5	1	13		19
Lehigh,		7		17		24
Luzerne,	2	7		7		16
Lycoming,		3		21		24
McKean,		8	1	6		15
Mercer,		45	1	10	1	57
Mifflin,		5	2	18		24
Monroe,				4		4
Montgomery,	1	14	1	14		30
Montour,		1		10		11
Northampton,		4		20		24
Northumberland,		3		14		17
Perry,		9		9		18
Philadelphia,		2		2		4
Pike,						
Potter,		7		16	1	24
Schuylkill,		2		5		7
Snyder,		3		16		19
Somerset,		28	1	18		47
Sullivan,		1		9		10
Susquehanna,		13		11	1	25
Tioga,		18	1	23		42
Union,		6		6		12
Venango,		10		5		15
Warren,		6		6		12
Washington,	3	44	2	21	2	72
Wayne,		5		21		26
Westmoreland,		59	1	27		87
Wyoming,		6		11		17
York,		19		30		49
Out of State,		9		13	1	23
Totals,	6	966	40	1,019	18	2,049

A COMPARATIVE TABLE SHOWING THE NUMBER OF STALLIONS OF EACH BREED AND THE NUMBER OF REGISTERED AND UNREGISTERED STALLIONS LICENSED IN EACH COUNTY OF PENNSYLVANIA—1916

County.	Percheron.	Belgian.	Shire.	Clydesdale.	French Draft.	Standardbred.	Non-standardbred.	French Coach.	German Coach.	Cleveland Bay.	Hackney.	Thoroughbred.	Morgan.	Saddle.	Shetland.	Jack.	Total number of registered.	Total number of unregistered.
Adams,	2	3	......	......	......	2	......	......	2	......	......	......	......	......	......	......	9	27
Allegheny,	5	5	1	......	......	5	......	......	......	......	2	......	......	......	......	......	18	5
Armstrong,	17	3	1	2	1	3	......	......	......	......	......	......	......	......	......	......	27	18
Beaver,	5	2	......	......	......	7	......	......	......	......	......	......	......	......	......	......	18	33
Bedford,	15	1	......	......	......	1	......	......	1	......	......	......	......	......	......	......	14	9
Berks,	4	2	......	......	1	3	......	......	1	......	......	......	......	......	......	......	11	27
Blair,	7	1	......	......	......	1	......	......	......	......	......	......	......	......	......	......	9	8
Bradford,	15	4	......	......	......	3	......	......	......	......	......	......	3	......	......	......	25	35
Bucks,	5	1	1	......	......	4	......	......	......	......	......	1	......	......	......	1	13	13
Butler,	17	9	1	......	......	4	1	......	......	......	......	......	......	......	......	......	32	7
Cambria,	3	2	......	......	......	2	......	1	......	......	......	......	......	......	1	......	9	11
Cameron,	1	......	......	......	......	1	......	......	......	......	......	......	......	......	......	......	2	......
Carbon,	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	3
Centre,	5	......	......	......	......	2	......	......	......	......	......	......	......	......	......	......	7	21
Chester,	13	1	......	......	......	13	......	......	3	......	8	9	......	1	......	1	49	37
Clarion,	23	9	3	......	1	1	......	......	1	......	......	......	......	......	......	......	38	20
Clearfield,	6	3	1	......	......	1	......	......	1	......	......	......	......	......	......	......	12	15
Clinton,	5	1	......	......	......	1	......	......	......	......	......	2	1	......	1	......	11	7
Columbia,	1	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......	2	12
Crawford,	37	3	2	......	1	6	......	1	......	......	2	......	1	1	1	......	55	28
Cumberland,	6	3	......	......	......	2	......	......	......	......	......	......	......	......	......	......	11	54
Dauphin,	1	......	......	......	......	2	......	1	1	......	......	......	......	......	......	......	5	10
Delaware,	3	......	......	1	......	1	......	......	......	......	5	2	......	......	......	......	12	2
Elk,	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	1	1
Erie,	18	1	1	......	......	7	......	......	1	......	1	......	......	......	......	......	29	20
Fayette,	13	3	......	......	......	2	......	......	1	......	......	......	1	1	......	1	22	16
Forrest,	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	1
Franklin,	21	10	......	......	3	8	......	......	......	......	1	......	......	......	......	......	43	51
Fulton,	5	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......	6	7
Greene,	22	3	1	......	......	9	......	......	1	......	......	1	......	3	......	......	40	9
Huntingdon,	6	......	1	......	......	1	......	1	......	......	......	......	......	......	......	......	9	23
Indiana,	14	3	2	1	3	6	......	2	......	......	......	......	......	......	......	......	31	19
Jefferson,	7	3	......	......	......	2	......	1	......	......	......	......	......	......	......	......	13	13
Juniata,	5	1	......	......	......	......	......	......	1	......	......	......	......	......	......	......	7	13
Lackawanna,	......	......	......	......	......	2	......	......	......	......	......	......	......	1	......	1	4	5

Lancaster,	7	.....	.....	.....	.....	7	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	15	31
Lawrence,	23	6	.....	.....	.....	7	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	37	8
Lebanon,	2	.....	.....	.....	.....	2	.....	.....	1	.....	.....	.....	.....	1	.....	.....	6	13
Lehigh,	2	1	.....	.....	1	1	.....	.....	1	.....	.....	.....	.....	.....	.....	1	7	17
Luzerne,	2	.....	.....	4	1	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	9	7
Lycoming,	2	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	8	21
McKean,	7	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	6
Mercer,	26	5	1	4	1	7	.....	.....	.....	.....	1	.....	.....	.....	1	.....	46	11
Mifflin,	2	4	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	18
Monroe,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Montgomery,	6	.....	1	.....	.....	3	.....	.....	.....	.....	3	.....	.....	1	2	.....	16	14
Montour,	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	10
Northampton,	3	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	20
Northumberland,	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	14
Perry,	6	2	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	9
Philadelphia,	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	2	2
Pike,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Potter,	5	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	17
Schuylkill,	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	5
Snyder,	3	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	3	16
Somerset,	20	5	.....	.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29	18
Sullivan,	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	9
Susquehanna,	5	.....	.....	1	.....	5	.....	.....	1	.....	1	.....	.....	.....	.....	.....	13	12
Tioga,	13	4	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19	23
Union,	5	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	6
Venango,	6	.....	.....	3	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	5
Warren,	4	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	6
Washington,	27	5	3	.....	2	11	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	49	23
Wayne,	2	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	1	.....	.....	.....	5	21
Westmoreland,	36	8	5	2	1	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	60	27
Wyoming,	4	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	6	11
York,	7	1	.....	.....	.....	2	.....	.....	4	.....	1	.....	1	2	1	.....	19	30
Out of State,	6	1	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	14
Total,	542	123	27	18	20	173	2	8	26	.....	26	15	8	11	8	5	1,012	1,037

TABLE SHOWING "VERY HIGHLY COMMENDED" STALLIONS: THEIR NUMBER, BREED AND THE COUNTY IN WHICH STANDING IN 1916.

County.	Clydesdale.	Percheron.	Standardbred.	Belgian.
Luzerne,	2	......	......	......
Montgomery,	......	1	......	......
Washington,	......	......	2	1
Total,	2	1	2	1

CLASSIFICATION BY BREED AND BY COUNTY OF REGISTERED AND UNREGISTERED UNSOUND STALLIONS LICENSED IN PENNSYLVANIA—1916.

County.	Percheron.	Belgian.	Shire.	French Draft.	German Coach.	Thoroughbred.	Standardbred.	French Coach.	Morgan.	Unregistered.	Totals.
Allegheny,	2	1	......	......	......	......	1	......	......	......	4
Armstrong,	1	......	......	......	......	......	......	......	......	1	2
Bedford,	......	......	......	......	......	......	......	......	......	2	2
Berks,	1	......	......	......	......	......	......	......	......	......	1
Blair,	1	......	......	......	......	......	......	......	......	......	1
Bradford,	......	......	......	......	......	......	......	......	......	3	3
Bucks,	......	......	1	......	......	......	......	......	......	......	1
Butler,	......	......	......	......	......	......	1	......	......	......	1
Cambria,	......	1	......	......	......	......	......	......	......	1	2
Chester,	......	......	......	......	2	......	1	......	......	3	6
Clarion,	1	......	......	......	......	......	......	......	......	......	1
Crawford,	3	......	......	......	......	......	......	......	......	......	3
Cumberland,	......	......	......	......	......	......	......	......	......	1	1
Elk,	1	......	......	......	......	......	......	......	......	......	1
Erie,	......	......	1	......	......	......	......	......	......	......	1
Fayette,	1	......	......	......	......	......	......	......	......	......	1
Franklin,	2	......	......	......	......	......	......	......	......	1	3
Greene,	1	......	......	......	......	1	2	......	......	......	4
Huntington,	1	......	......	......	......	......	......	......	......	......	1
Indiana,	......	......	......	......	......	......	......	1	......	......	1
Lancaster,	1	......	......	......	......	......	......	......	......	......	1
Lebanon,	......	......	......	......	......	......	1	......	......	......	1
McKean,	1	......	......	......	......	......	......	......	......	......	1
Mercer,	......	......	......	......	......	......	1	......	......	1	2
Mifflin,	......	1	......	......	......	......	1	......	......	......	2
Montgomery,	1	......	......	......	......	......	......	......	......	......	1
Potter,	......	......	......	......	......	......	......	......	......	1	1
Somerset,	1	......	......	......	......	......	......	......	......	......	1
Susquehanna,	......	......	......	......	......	......	......	......	......	1	1
Tioga,	1	......	......	......	......	......	......	......	......	......	1
Washington,	1	......	......	1	......	......	......	......	......	2	4
Westmoreland,	1	......	......	......	......	......	......	......	......	......	1
Out of State,	......	......	......	......	......	......	......	......	......	1	1
Totals,	22	3	2	1	2	1	8	1	......	18	58

TRANSMISSIBLE DISEASES

ANTHRAX

At the present time the method of immunizing against anthrax requires the administration of two strengths of vaccine, twelve days apart. This makes the process somewhat expensive, and since the Board did not carry out this work at the expense of the Commonwealth this year, fewer herds have been vaccinated against anthrax than formerly.

By referring to the anthrax table that follows, it will be noted that twenty animals died previous to vaccination. This indicates that many of the herd owners who finally had their herds vaccinated did so only after having lost one or more animals. Most of these losses would have been prevented if the stock had been vaccinated in the spring before it was turned out to pasture.

The Board is at this time preparing and hopes to have ready for distribution in time for the next annual spring vaccination, an anthrax vaccine and serum that can be administered at the same time. The idea is to do away with the second injection in connection with this work and thereby reduce the cost of the anthrax vaccinations about one half.

ANTHRAX

Counties.	Herds	No. of Animals Vaccinated	No. of Animals Dead	
			Previous to Vaccination	Following Vaccination
Berks,	1	11	0	0
Bradford,	3	23	2	0
Chester,	2	57	0	0
Clearfield,	1	13	0	0
Delaware,	2	71	0	0
Fayette,	2	2	8	0
Jefferson,	3	26	0	0
Lycoming,	3	13	6	0
McKean,	8	169	0	0
Montgomery,	4	89	1	0
Potter,	8	114	1	0
Susquehanna,	2	33	0	0
Tioga,	4	49	1	0
Warren,	4	90	1	0
Wayne,	1	41	0	0
Wyoming,	1	27	0	0
Totals,	49	828	20	0

BLACKLEG

On June 24th, 1915, the Board discontinued paying veterinarians for the administration of blackleg vaccine. The annual spring vaccination carried out this year was therefore done at the expense of the owner; the Board supplying the vaccine free of cost.

The stock owners of the State appreciate the value of vaccinations against blackleg as is proven by the fact that more herds were vaccinated this year than in former years. The number of deaths due to this disease would be further reduced if all stock owners in known blackleg infected disticts would have their young stock vaccinated annually.

The following table will show the counties in which vaccinations against blackleg were carried out this year, the number of vaccinated herds in each county, the number of animals vaccinated and the losses sustained:

BLACKLEG

Counties.	Herds	No. of Animals Vaccinated	No. of Animals Dead Previous to Vaccination	 Following Vaccination
Armstrong,	5	3	0	0
Beaver,	22	80	0	0
Bedford,	4	30	1	0
Blair,	5	66	12	1
Bradford,	8	69	4	0
Butler,	2	7	0	0
Cambria,	5	83	4	0
Centre,	1	4	1	0
Chester,	3	39	0	0
Clarion,	6	32	0	0
Crawford,	7	78	8	0
Dauphin,	1	33	1	0
Erie,	33	469	8	0
Elk,	3	26	0	0
Fayette,	4	35	5	0
Greene,	6	77	3	0
Indiana,	4	29	3	0
Jefferson,	1	4	0	0
Lackawanna,	5	37	5	0
McKean,	8	113	0	1
Perry,	8	91	0	0
Potter,	18	211	10	0
Somerset,	57	928	26	0
Sullivan,	2	16	2	0
Susquehanna,	125	1,228	28	0
Tioga,	7	92	4	0
Venango,	2	14	2	0
Warren,	1	13	0	0
Wayne,	147	2,025	33	3
Westmoreland,	3	24	2	0
Wyoming,	2	15	0	0
Totals,	505	5,971	162	5

INFECTIOUS ABORTION

Infectious abortion is recognized by such names as slipping, casting, picking, cattle abortion and contagious abortion. It is found in practically all parts of the world where cattle are kept. A form of infectious abortion is found in many species of animals, but it is not usually communicated from one species to another under practical farm conditions. The disease as it affects cattle is of much economic importance. Abortion may occur as a result of injuries, fright, from certain diseases and certain poisons. When due to such causes it is spoken of as sporadic abortion and is seldom observed. By infectious abortion is meant the expulsion of the fetus anytime before due, but usually before it is sufficiently developed to live after birth, by a large percentage of the pregnant animals on the same premises. The calf may live if born any time after the seventh month of pregnancy. In 300 cases where conditions were carefully studied it was believed that 240 were due to the infectious and 60 to the sporadic form of abortion. The average age of the cows which aborted was 4½ years and the average period of gestation at which it occurred was 6¼ months. Of the 240 cows only 19 aborted a second and 5 the third time; while 168 retained the placenta or afterbirth. It is not stated how many subsequently became sterile.

The course of the disease is chronic and abortion is usually the first symptom observed. The disease is most virulent when first introduced into a herd. In such cases 50% or more of all the members of the herd may abort. In certain cases no calves can be raised. 20% of the herd have been known to abort year after year.

It is estimated that about 20% of all cows in the country are infected with the infectious form of abortion.

The losses from it are classified as follows:—

1. Diminished production of milk,
2. Loss of calves,
3. Temporary or permanent sterility,
4. Diseased udder,
5. Septic condition of the uterus,
6. Sale of otherwise profitable cows.

Some authorities claim that it depreciates the value of each infected cow to the extent of about $35. If this is true infectious abortion stands near the top of our animal plagues.

The case of the disease is the bacillus of Bang which is usually found in conjunction with several other varieties of micro-organisms. They multiply principally in the genital organ of a pregnant cow. It is not known that an infected cow ever recovers from the disease yet she seldom aborts more than once or twice. The best authorities consider her a possible spreader of the disease as long as she lives.

The organisms are passed from an infected animal in the fetus, the fetal envelopes, vaginal discharge and the milk. They will remain virulent for some time on litter or other contaminated articles outside of the animal body.

It is not known positively how the infection is conveyed to a susceptible animal. The organisms that cause the disease have been found in the milk from infected cows. Some believe that the infection is obtained by the calf from the mother's milk and carried by it till pregnancy when the disease starts up and produces abortion. An example mentioned later would show that this is not always the case.

From experimental work it has been shown that the surest way to infect a susceptible animal is to inject infectious material into the blood stream. The next surest plan is through the digestive tract in the feed or drink. The disease has also been produced artificially by placing infectious material in the vagina, and by some it is believed that this is the most common form of infection. For this reason the bull has been considered as a carrier. Considerable work has been done to show that he is responsible for some of the trouble. In most cases such efforts have been negative, yet theoretically there is no reason why he should not carry it from an infected to a susceptible cow. In most cases infection is carried into a healthy herd by an infected cow. Bang considers the period of incubation as ten weeks.

Symptoms. A cow may be infected for months or years and show no symptoms. In early abortions there are seldom any symptoms. The first indication is the dead calf. In later abortions the symptoms of normal parturition are seen. There is more or less edema of the udder, filling and tenseness of the teats. In cows that are giving milk there is a sudden decrease in amount. The milk may contain blood or curd which resembles colostrum. A glary mucous which may be streaked with blood appears from the genital organs. Immediately preceding and a few days following parturition the discharge is yellowish. This material is highly infective.

In early abortions the fetal envelope usually pass with the fetus. Retention of the afterbirth is common after the fifth month of pregnancy. The os closes quickly and it is difficult then to remove the afterbirth. Dystokias are not common except with twins. Milk fever is seldom seen after abortion. Mastitis, metritis and endo metritis are rather common. Estrum follows soon after early abortion.

Infectious abortion should be suspected in herds when several animals have aborted; when there are a number of cows with retained afterbirth whether they carried the calf to the full term of pregnancy or aborted, and also where any considerable number of cows will not conceive or become pregnant. The surest plan known for detecting the extent of infectious abortion in a herd is to examine the blood by the complement fixation, and agglutination tests. Our laboratory has had usually good results with the complement fixation tests. One cannot tell from the reaction to the blood test whether the animal has aborted or will abort but it will show in a reliable manner whether the animal is or is not affected with the disease.

For a number of years we have received complaints from herd owners in reference to abortion, sterility, etc. The State Livestock Sanitary Board has been able to furnish but little assistance, yet it has given a great deal of attention to these diseases and all the advice and help possible. Considerable work has been done in the laboratory on the serological and bacteriological tests, and from a diagnostic point of view there has been some benefit derived from them. It has been observed for a number of years that abortion thrives best and is the most difficult to eliminate in large herds where unprofitable animals are constantly being replaced by new purchases. It is quite unusual to find such herds free from abortion and sterility.

In small herds in rural sections of the State where animals are seldom purchased very few cases of abortion or sterility are reported. Complaints have been confined principally to large pure bred herds. In one such herd abortion was very frequent up to five years ago. There have been no cases of abortion or sterility in this herd for the past two years. It is believed that the good results obtained were due to isolation, cleanliness and disinfection and that equally as good results may be obtained in any well equipped herd with the assistance of the average veterinarian. From the laboratory tests we know that there are still animals in this herd afflicted with contagious abortion. Nearly all have granular vaginitis, yet there has been practically no trouble from sterility. The calves have been raised on unpasteurized milk, kept isolated from the old members of the herd until they are safely in calf, and were brought into the herd after they had dropped their first calf and became safely settled with the second. No vaginal or uterine injections were given to those that calved normally. The stables were carefully disinfected once a week and the posterior portion of each animal in the herd was carefully washed with a disinfectant every day from the time of normal calving till they were considered safely in calf again.

From the observations made in this herd it would not appear that the contagion is carried over from the time of drinking milk. An interesting practical experiment as tried with 20 heifers, all of which had been raised until weaning period on raw milk from animals some of which were known to be infected. When ready to breed, they were divided into two lots of ten each. Lot No. 1 was placed in a disinfected stable in which no abortions had ever occurred. This stable was located about a mile from the regular dairy barn and was attended by a man who did no work around the regular herd. Lot No. 2 was placed in the dairy barn in contact with the regular herd and handled as part of it. Both groups were bred to the same bull which had not been or was not at that time used on other members of the herd. Lot No. 1 dropped 100% healthy living calves, while in lot No. 2 there was 90% of abortions. It is reasonable to suppose in this case also that the infection was not due to the feeding of raw milk from this infected herd, or carried by the bull because his genital organs were carefully disinfected before and after each service.

There seems to be some reason for believing that uninfected pregnant animals are reasonably safe and that the greatest danger of becoming infected is between normal parturition and the following pregnancy. We believe that it is possible to control abortion in good herds that are kept in modern, sanitary stables where most of the animals are raised on the farm; especially where the owner is intelligent and interested and is given the proper veterinary assistance. The task of controlling it in such herds is entirely too much for the average breeder or the average veterinarian who has never given the subject more than ordinary attention. We believe that no good results will be accomplished by the use of the vaginal douches as applied by the herd owner or the average veterinarian, because it does not reach the seat of trouble. In many cases they do more harm than good. Good result will be obtained in giving the uterus proper treatment. In former years it was the custom to advise owners not to breed aborting cattle for three or four months after abortion and that vaginal douches with mild antiseptics should be given daily as long as there is a discharge. It is believed now that this advice was wrong and that more good will be accomplished by two or three applications directly into the uterus soon after abortion and then bred immediately. This treatment must be done by one who has been properly trained and has the necessary instruments and experience. Many cases of sterility will occur in animals that are not bred for three or four months, no difference how they are treated, while if bred early they may conceive and carry their calves to full maturity.

So far as controlling abortion is concerned, there is no medicine or remedy known that will prevent or cure it. No good will be accomplished in the treatment of sterility by the inexperienced by such common operations as opening the os by forcing a sharp stick or the finger into it, or by the average man attempting to rupture ovarian cysts. In nearly all cases of pyometra and endometritis that have been investigated by the Board, it was found that these diseases were brought about by improper treatment. Good results may be obtained in most cases of sterility that are due to such conditions as pyometra, endometritis, etc. if properly treated. There has been too much of a tendency in the past to sell animals that would not breed, and those that aborted, or those that were considered incurable or dangerous to the other members of the herd. Very little will be accomplished in trying to eliminate abortion by selling those that abort. They may not recover from the disease or cease to be spreaders, but there is no doubt but that a very large part of them will not abort after the first time.

Many of the sterile animals may be rendered useful as breeders if properly treated. The proper form of treatment cannot be outlined to cover all cases, but should be left to the good judgment of the man who makes the examination.

Treatment:

(1) In herds where the disease has occurred and where susceptible animals are kept it is advisable to disinfect the stable frequently, once a week at least, with some antiseptic that has been approved by the United States Government, or by some other authentic source.

(2) All susceptible animals that are not pregnant should be carefully washed on the posterior quarters once each day with a one per cent. solution of lysol or some other suitable antiseptic.

(3) Careful observations should be made of each susceptible animal during the period of pregnancy. If any symptoms of abortion appear or an animal aborts before the symptoms are observed, it should be removed immediately to an isolation ward and kept there as long as there is any discharge. This is the proper time to treat the uterus, and the treatment should be applied by a person who is familiar with the operation. Three treatments, a week apart, with a two per cent. lugol's solution is usually sufficient. The animal should then be bred as soon as possible after the discharge has ceased.

(4) The disease is probably carried to the genito-urinary or digestive tract by the infected material that originates from the genito-urinary tract of infected cattle.

(5) The gutters behind infected cows that have a genital discharge are especially dangerous. They should be carefully cleaned and disinfected each day and the animal should be segregated as long as there is a discharge. Extreme care should be given to prevent the use of brooms, forks, shovels, and shoes of men from carrying infection from such cows to the feed or feeding floors of susceptible animals. Especial attention should also be given to the prompt removal of the aborted foetuses, the foetal placenta, the litter and manure which has become infected. This should be burned or rendered aseptic as soon as possible, and spread on the field and ploughed under.

(6) The long hairs around the external opening of the sheath of the bull should be clipped and kept short and clean. Immediately before and after every service whether in infected herds or not his sheath should be carefully and thoroughly syringed with a warm solution of a one-half of one per cent. therapogen or some other reliable but non-irritating antiseptic.

(7) It is possible that calves may become infected by milk. For this reason all milk used as calf food should be heated to about 180° F. It should be obtained and stored according to regulations provided for handling certified milk. The utensils should be carefully washed and scalded before every feeding. Calves should be kept in clean, warm, dry stalls. If these precautions were constantly practiced there would be much less trouble from calf scours, calf pneumonia, tuberculosis and abortion.

Veterinarians should be able to determine the cause of sterility in dairy cows. They are not able to do so unless they have given the subject more than the usual attention. They must be equipped with suitable instruments for making the examination and then know how to use them. In most cases the cause will be found to be metritis, endometritis, pyometra or cystic ovaries which has been brought about by infectious abortion or the improper treatment of some less important condition. A properly trained veterinarian should be able to tell whether the case of sterility is curable with a reasonable amount of treatment. Even men who are well trained in this line of work will meet with difficult and discouraging conditions. It is difficult at times to locate the ovaries and determine whether or not they are healthy. It is also sometimes difficult to pass a sound or catheter through the os into the uterus or its horns. An uncontrollable hemorrhage occasionally results from rupturing ovarian cysts. For the present we do not feel justified in recommending this form of sterility to any except those who have been especially trained. We do feel, however, that all veterinarians who are interested in cattle practice should study this subject and be prepared to do the things that are known to be useful.

Congress has appropriated $50,000 to the Federal Bureau of Animal Industry for the purpose of studying infectious abortion. We should follow the progress made by the Bureau and endeavor to keep posted on whatever progress is made in handling these important diseases. Those not equipped or able to combat abortion and sterility under the somewhat ideal conditions outlined are not justified in spending time, energy or money in an effort to control them. The possibilities of controlling them under proper conditions is not an unreasonable proposition. There is a tendency at the present time to be too pessimistic. It can be done by the proper application of the information already at hand. The limitations depend entirely upon how well these facts are known and how thoroughly they are applied.

On January 5th, 1916, Dr. W. L. Williams demonstrated the Albrectson method of disinfecting the uterus to Drs. Marshall, Munce, Ridge, Noack and Staley at the State Institution for Chronic Insane, South Mountain. Later Dr. Ridge received further instructions from Dr. Williams and started the demonstration of this treatment throughout the State. Dr. G. A. Dick was taught the method and assisted him in the work. During the year this work has been demonstrated in 17 stables on 116 cows. 225 treatments have been carried out and 24 local practitioners have been given instructions in the work.

GLANDERS

The plan for detecting and handling glanders as outlined in our report of last year has been followed this year and in addition vigorous campaigns against the disease have been carried on in Philadelphia and Pittsburgh.

On June 18th a number of the Board's agents were sent to Pittsburgh and applied tests to all horses and mules in a section where glanders was known to exist. About four hundred head of horses and mules were examined and tested at that time and the worst center of glanders infection in Pittsburgh eradicated.

On June 25th a number of agents were sent to Philadelphia and tests were applied to the horses and mules in all stables in the city where glanders was known to exist or where we had reason to suspect it might exist. One thousand head of horses and mules were examined and tested June 25th-26th.

Believing watering troughs to be an important factor in the spread of glanders and being desirous of taking every possible precaution to prevent the further spread of glanders in Philadelphia, the Board, on October 8th, adopted the following resolution: "Resolved, That in accordance with the provisions of the Act of April 1, 1905, P. L. 100 and the Act of July 22d, 1913, P. L. 928, no public watering troughs or other vessels used as receptacles for water shall be kept open or in use in the City of Philadelphia during the prevalence of glanders among animals subject to the disease; and be it further resolved that the foregoing order remain in force until revoked." On November 6th the Philadelphia Board of Health adopted the following resolution: "Resolved, That the Board of Health of Philadelphia hereby gives notice of the prevalence of glanders in this city and to the dangers of its transmission and hereby declares that public watering troughs or other vessels kept open for public use for watering animals subject to glanders, are nuisances having a tendency to be prejudicial to the public health, and the owners, agents or their proper representatives of all such troughs or receptacles, are hereby notified and required to discontinue forthwith the use of such troughs and receptacles. On failure to comply with the terms of this Resolution within the time specified, the Director of the Department of Public Health and Charities is hereby authorized and directed to abate said nuisances in accordance with law and the rules and regulations of the Board of Health."

This ban on public watering troughs in Philadelphia is still in force and has the hearty support of the Humane Societies, Team Owners Association, Milk Dealers Association and similar organizations.

We have been recommending that all newly purchased animals be subjected to a careful test before being introduced into a stable that is known to be free from glanders. We have also urged veterinarians to test all cases that are the least suspicious for glanders.

As a result of the above suggestions, sixty tests of this sort have been carried out during the past year covering about one hundred head of horses.

The following table will show the distribution of glanders during the year. More horses were tested this year than any other one year since the organization of the Board. This fact and the figures given in the table would seem to indicate that glanders had greatly increased during the year. There was a greater number of stables visited and a greater number of animals examined and tested, but the percentage of condemned animals (4%) is less than the percentage of condemnations for the past five years. This reduction in the percentage of condemnations is particularly gratifying when we remember that we have, at the present time, better diagnostic facilities than in former years and stand less chances of passing, as healthy, animals that are infected.

GLANDERS

Counties.	No. Cases Reported.	Animals Examined Physically.	Animals Tested with Mallein.	Animals Retested.	Condemned on Test.	Condemned on Physical Ex.	Total Number Condemned.
Adams,	3	10	10	3	1	1	2
Allegheny,	156	578	571	141	30	4	34
Armstrong,	1	1	1	0	0	0	0
Berks,	1	2	2	0	0	0	0
Bradford,	2	2	2	0	0	0	0
Bucks,	1	1	1	0	1	0	1
Cambria,	3	6	6	2	1	0	1
Chester,	2	3	3	0	0	0	0
Dauphin,	1	1	1	0	0	0	0
Delaware,	9	59	59	2	1	1	2
Erie,	3	4	4	0	0	0	0
Fayette,	1	6	6	0	0	0	0
Franklin,	2	35	35	0	0	0	0
Lackawanna,	4	5	5	0	0	0	0
Lancaster,	36	103	103	16	4	0	4
Luzerne,	2	3	3	0	0	0	0
Montgomery,	12	53	53	0	0	0	0
Perry,	1	1	1	0	0	0	0
Philadelphia,	222	6,666	6,605	475	315	36	351
Somerset,	3	3	3	0	0	0	0
Washington,	1	1	1	0	0	0	0
Westmoreland,	1	1	1	0	0	0	0
Totals,	467	7,544	7,476	639	353	42	395

HOG CHOLERA

Our hog cholera work this year was progressing very satisfactorily with few cases reported until the latter part of March and the early part of April. Then the number of cases of hog cholera reported increased rapidly due principally to infection spread from public sales.

It seems to be the practice in some counties, particularly Cumberland and Franklin counties, to hold large sales of hogs. Frequently the same hogs will pass through two or three sales before they are finally purchased by a farmer and taken to his premises. It is at these sales that dealers from other sections of the State buy up hogs to make a carload and ship to their home county where they are again sold. Almost invariably hogs bought at these sales develop cholera when they finally reach the farmers' premises.

Easily eighty percent of the cases of hog cholera encountered this year are traceable to these sales. We, therefore, have taken advantage of every opportunity to bring this point to the attention of the farmers and advise them against purchasing hogs at public sales. In addition to this we have instituted proceedings against a dealer who purchased hogs in one county, took them across several counties to his own home county, held two large public sales and spread infection broadcast in two counties, causing enormous losses.

The total number of hogs in this State this year is estimated at 1,150,500, their total value $14,841,500—the average value per head being figured at $12.90. Incident to our hog cholera work we examined 18,217 hogs or about 1½% of the total number of hogs in the State. Even if we consider that all the hogs that we examined were exposed to infection with hog cholera the percentage of exposed hogs is remarkably small.

Out of the 18,217 hogs that we examined, 4,978 or 28% of the animals showed symptoms of hog cholera. This high percentage of affected animals indicates that there is too much delay in reporting outbreaks.

We vaccinated 11,618 animals and 2,525 animals or 21% died following vaccination. This 21%, of course, includes all deaths, from no matter what cause, from the time the animals were vaccinated until the report is submitted and the premises released from quarantine.

If the exposed animals had not been vaccinated the losses would have reached at least 90%. By vaccinating we reduced the losses to 21%, making a saving of 69% of the animals that were fit subjects for vaccination or a saving of 8,015 hogs. Valuing these animals at $12.90 per head we have a total of $103,303.50 or the amount of money saved hog owners of this State by the serum treatment.

HOG CHOLERA

Counties.	No. Animals Examined.	No. Showing Symptoms.	No. Dead Before Vaccination.	No. Animals Vaccinated.	No. Dead Following Vaccination.
Adams,	196	39	33	131	26
Allegheny,	278	169	90	100	45
Armstrong,	153	28	39	118	4
Beaver,	43	9	8	40	17
Bedford,	300	123	127	142	45
Berks,	384	136	115	249	62
Blair,	60	10	12	51	0
Bradford,	26	3	2	21	2
Bucks,	771	165	95	520	172
Butler,	33	6	6	32	20
Cambria,	526	12	17	384	7
Cameron,	30	30	30	0	0
Carbon,	307	49	40	114	6
Centre,	653	183	169	388	34
Chester,	1,194	204	234	872	209
Clearfield,	110	59	61	40	0
Columbia,	160	27	20	109	22
Crawford,	38	22	15	19	3
Cumberland,	862	216	195	542	88
Dauphin,	555	157	132	358	83
Delaware,	2,287	228	379	2,189	140
Elk,	93	17	13	83	14
Erie,	53	28	25	29	8
Fayette,	218	122	73	111	34
Franklin,	1,497	618	374	8[illegible]0	349
Greene,	41	17	14	25	9
Huntingdon,	70	40	26	32	10
Indiana,	374	119	98	220	81
Jefferson,	22	9	8	13	0
Lackawanna,	91	10	5	82	23
Lancaster,	426	127	101	282	81
Lawrence,	206	64	30	104	15
Lebanon,	64	32	27	26	2
Lehigh,	274	71	72	112	19
Luzerne,	428	83	80	309	38
Lycoming,	34	10	2	13	0
McKean,	25	10	21	25	0
Mercer,	237	71	29	140	60
Mifflin,	166	66	77	0	0
Monroe,	303	140	76	179	54
Montgomery,	1,583	423	287	1,006	252
Montour,	364	55	99	238	46
Northampton,	469	210	183	127	48
Northumberland,	259	117	97	55	11
Perry,	76	44	67	14	0
Philadelphia,	565	82	72	551	182
Schuylkill,	527	157	134	241	80
Snyder,	86	44	33	14	5
Sullivan,	10	3	0	0	0
Tioga,	9	9	9	0	0
Union,	36	9	9	0	0
Washington,	145	77	86	65	44
Westmoreland,	85	49	24	47	26
Wyoming,	24	24	23	3	0
York,	391	146	139	256	49
Totals,	18,217	4,978	4,232	11,618	2,525

RABIES

There has been no change in the plan for handling rabies as outlined in our report for last year. An examination of the records pertaining to the control of rabies covering a number of years shows that every few years it would seem that great progress was being made in the eradication of this disease. However, the following year the records would indicate that the disease was not nearly stamped out though it need not necessarily be as bad as formerly.

In 1913 there were two hundred ninety-four cases reported, in 1914, the number of cases reported was reduced to one hundred sixty-five, in 1915, the number rose again to three hundred twenty-seven and this year, as will be noted in the table below, there were one hundred fifty-nine cases reported.

This table also gives information as to the distribution of the disease by counties, the number of animals quarantined, localities quarantined, animals destroyed incident to quarantines of localities and the number of persons bitten.

RABIES

Counties.	No. Positive Cases Reported.	No. Animals Quarantined.	Localities Quarantined.	Animals Destroyed.	Persons Bitten.
Allegheny,	9	13	0	0	2
Beaver,	3	39	0	0	0
Butler,	2	50	0	0	0
Cambria,	13	45	1	54	14
Carbon,	3	52	1	31	1
Chester,	8	4	1	17	4
Clarion,	7	37	1	107	8
Columbia,	1	18	0	0	0
Crawford,	8	44	0	0	2
Cumberland,	18	103	0	0	2
Delaware,	3	29	1	147	0
Erie,	16	21	0	0	15
Fayette,	2	13	0	0	2
Indiana,	1	4	0	0	1
Lackawanna,	1	0	0	0	0
Lancaster,	4	2	0	0	2
Lawrence,	6	21	0	0	7
Luzerne,	8	29	0	0	4
Mercer,	7	10	0	0	6
Montgomery,	8	15	0	0	1
Northampton,	1	1	0	0	1
Perry,	1	26	0	0	2
Philadelphia,	10	4	0	0	10
Somerset,	4	49	0	0	2
Venango,	11	14	0	0	5
Warren,	3	0	0	0	5
Washington,	6	88	0	0	1
Westmoreland,	4	9	0	0	1
York,	1	0	0	0	0
Totals,	159	740	5	356	98

121 supposed cases of rabies proved negative on investigation.

MISCELLANEOUS

We have handled over four hundred miscellaneous cases of such diseases as actinomycosis, mange, poultry diseases, diseases of sheep, distemper, bacterial dysentery, sporotrichosis, forage poisoning, etc.

In connection with the campaign the Secretary of Agricuture is carrying out, to increase the number of sheep raised in this State, the Board was called upon to send a representative through Ohio and Michigan and later into New Jersey to look up sheep for prospective purchasers and examine them to prevent the introduction of transmissible diseases of sheep into the State.

The latter part of November it was reported that foot-and-mouth disease had again made its appearance in the western part of the United States and quarantines were immediately adopted by the Federal authorities. The Board, on November 27th, sent the following telegram to the Federal authorities, the Federal inspectors in charge at the various stockyards, the livestock officials of the surrounding states and all the railroad companies bringing livestock into or through Pennsylvania: "The Importation into Pennsylvania of cattle, sheep, other ruminants or swine, originating in any part of the State of Nebraska, also of cattle, sheep, other ruminants or swine handled through the Kansas City Stock Yards, for any purpose, is prohibited."

On November 29th Dr. R. M. Staley, who has charge of transmissible diseases, was sent to investigate the situation in the West with the view of keeping this office informed in order that proper quarantine regulations might be adopted and all quarantine restrictions revoked at the earliest date possible. Ther was some question as to whether or not the disease was foot-and-mouth disease and he was instructed to make a careful study of it.

On December 2d he sent the following telegram from Waneta, Nebraska:

"Have been with Day. Saw plenty disease on several ranches. It is not foot-and-mouth disease. We can receive stock with safety when B. A. I. lifts their quarantine. Will be here until Monday noon then Chicago unless advised that you think it necessary to go to Kansas City."

On the strength of information given by the Federal Bureau of Animal Industry and the contents of the above telegram we, on December 4th, revoked the quarantine that had been established against livestock from Nebraska and the Kansas City Stock Yards.

The following is a report on the disease which proved to be Vesicular Stomatitis instead of foot-and-mouth disease:

"As stated in my telegram dated, Waneta, Nebraska, December 2d, it was definitely decided on that date the disease in Nebraska reported as foot-and-mouth disease was not this disease but Vesicular Stomatitis. The following is a report on this outbreak of Vesicular Stomatitis and the results of my investigation:

The disease has existed in the Allies concentration camps at various points from Denver to the Atlantic Coast since early last summer. On October 14th, 1916 it was discovered at the Calumet Park Stock Yards, just outside of Chicago and upon examining thirty-seven hundred head of horses at that point five hundred cases were found. Subsequently the disease spread through the entire lot of horses.

On October 16th, 1916 the disease was found among horses in the Chicago Stock Yards. As long as the disease was found only in horses no particular significance was attributed to it especially since they found it to be easily controlled and cured.

On November 18th, 1916, one hundred twenty-seven steers and four cows were shipped from J. R. Robertson's ranch, Waneta, Chase County, Nebraska, to a commission firm at Kansas City Stock Yards. They were unloaded at St. Joseph, Missouri, November 19th, 1916 for rest, feed and water and arrived at Kansas City, November 21st, 1916.

The cattle were put on the market and fifty-two were sold for immediate slaughter at a local packing house. Twenty head were sold as feeders and went to Tescott, Kansas. Fifty-nine remained in the Kansas City Stock Yards. Fortunately the fifty-two sold for immediate slaughter were killed under inspection. On post-mortem tongue lesions were found and tagged as foot-and-mouth disease suspects. The cattle were traced and the fifty-nine head remaining in the Stock Yards were found and examined. These cattle also showed symptoms that were very suspicious for foot-and-mouth disease especially in the absence of any negative points such as developed later. These cattle were immediately quarantined as were the surrounding pens. The cattle that were shipped to Tescott, Kansas were traced, quarantined and examined. They showed the same symptoms as shown by the cattle in the Kansas City Stock Yards.

An investigation was made on the Robertson ranch, Waneta, Nebraska, at which point the cattle originated. There remained on the Robertson ranch about two hundred head of cattle, forty head of horses and seven hundred hogs. Fifty-five of the remaining cattle showed lesions. All of the horses showed lesions but none of the hogs showed lesions.

Further investigation in the vicinity of Waneta, Nebraska disclosed Vesicular Stomatitis in one sales stable and on twelve ranches.

The disease reached Waneta, Nebraska in the following manner:

Ryan and VanSyoc (sike), horse dealers at Waneta, bought up horses for the Allies and shipped them to Denver, Colorado for examination by the Allies' veterinarians. In each car shipped there were a certain number of rejects. The rejects were held at the sales stable in Denver until a carload had accumulated. They were then reshipped to Waneta and sold locally.

The army rejects shipped back from Denver about October 10th, 1916, brought the infection to the Ryan and VanSyoc Stock Yards and Stables.

Mr. Robertson, the man from whose ranch the cattle were shipped to Kansas City, stabled his horses in the Ryan and VanSyoc stable while in town, also traded one of his horses for one of the army rejects and took the reject to his ranch. Robertson's horses all developed the disease and his cattle also became infected.

I. D. Vaughn, who works on the Robertson ranch, owns two cows, seven hogs and four horses. His horses were driven to the Robertson ranch daily, became infected and infected his cattle. The hogs did not contract the disease. One hog on these premises showed a small sore on its tongue but it was not typical of the lesions that were observed on the tongue of horses and cattle. This hog was kept under observation and it was the opinion of the veterinarians that this hog was not affected with the disease from which the horses and cattle were suffering.

Fred Ganger worked a team of horses on the Robertson ranch returning them to his own barn at night. This team developed the disease and it spread through the Ganger stock of twenty horses and seventy head of cattle. His forty hogs did not develop the disease.

Henry Petch had a team of horses in the Ganger barn; they contracted the disease and carried it to Petch's stock of twenty-five head of horses which were just beginning to show the disease when I was on his ranch. His forty head of cattle were not yet affected and his forty head of swine were not showiug symptoms.

The Emerling ranch received a carload of cattle which were yarded at Waneta in the Ryan and VanSyoc Stock Yards. These cattle picked up the infection and it spread through one hundred head of steers, seventeen cows, one bull and all horses on his premises. Nine head of hogs showed no symptoms.

All other cases in the vicinity of Waneta were traceable to the Ryan and VanSyoc stables as horses from each of these ranches had been stabled in the Ryan and VanSyoc stables, while the ranchmen were in town. The few horses used in the town of Waneta, all had contracted and passed through the disease.

The sales stable and each ranch was placed under quarantine. No particular treatment was attempted though some of the ranchmen were placing a teaspoonful of powdered copperas on the tongue of each affected animal. The last new case in the vicinity of Waneta was reported on November 25th, 1916.

On every ranch the hogs followed the cattle and in many instances were fed on milk produced by affected cows. No hogs contracted the disease.

In no instance did horses, cattle or hogs show foot lesions.

The horses showed symptoms first in every instance but this, of course, was due to the fact that the horses were the animals that were away from home, came in contact with the disease and brought it home to the other horses and cattle on the premises.

Apparently the cause of the disease does not live outside of the animal body for any length of time and the disease is spread by actual contact only.

The horses used to distribute hay to the affected animals at the Calumet Park Stock Yards contracted the disease. None of the forty horses used to haul manure, litter, etc., out of the Calumet Park Stock Yards, when the place was being cleaned and disinfected incident to this outbreak, contracted the disease. These animals were driven right into the paddocks formerly occupied by the affected animals, nibbled fragments of hay left in the paddocks but never came in actual contact with any of the affected animals.

The disease usually runs a uniform non-fatal course. There is no rise in temperature and no apparent constitutional disturbances. Usually the first symptoms noticed is salivation. The animal champs its jaws somewhat, causing a froth to appear about the mouth. It is a light froth. The saliva is seldom ropy and the salivation is never severe enough to form pools on the ground where the animal stands.

Among cattle acute cases show vesicals on the dorsum of the tongue. They are not found on the under surface except at the border where the fluid sometimes gravitates from vesicals on the upper surface. Lesions are also found on the soft palate and under the upper lip. They are seldom, if ever, found on the dental pad or buccal membranes. The edges of the nostrils become infected from licking. They have a chapped appearance, crack and may show raw granulating surfaces which heal rapidly. It is noticed that scar tissue does not form and that the healed skin is not pigmented.

In horses the tongue is affected just about the same as in cattle. Lesions are found on the soft palate, a favorite seat being the medium line of same. The buccal membrane of horses is frequently the seat of lesions. The lips become infected from the saliva, become odematous and resemble in some instances a case of pupura hemorrhagica. This, of course, is the extreme case. Usually the lips are only slightly thickened and have about the same general appearance as the rim of the cattles' nostrils. They also heal without the formation of scar tissue and the healed portions are not pigmented.

The vesicals present the same appearance in cattle and horses. They contain a clear white fluid, are not full, not sharply defined and have more the appearance of a separation of the mucous membrane from the basement membrane with the intervening space partially filled with clear fluid. The mucous membrane rubs off leaving the basement membrane a clean, healthy, pink, sensitive surface which heals by granulation. At times the borders seem to fold over each other.

In some instances two or more of the vesicals will become confluent. Such a case as this was encountered and in taking hold of the tongue to draw it out the mucous membrane slipped off the front half of the tongue just as it frequently does in foot-and-mouth disease. None of the vesicals left that distinctly punched out appearance frequently seen on foot-and-mouth disease tongues.

In lesions underneath the upper lip of cattle and upon the buccle membrane of horses there was a distinct piling up of the epithelium which dropped out in large pieces after which the lesion healed rapidly.

The duration of the disease may be said to be only as long as the sore tongue keeps the animal from eating. In range cattle and horses this period is not more than two or three days. These animals lose little flesh and what they do lose is regained rapidly because their appetite is not impaired and as soon as their tongue will permit they eat ravenously.

In shipped horses ninety percent of the animals do as well as stock on the range. The other ten percent are kept from eating for four or five days, drink large quantities of water, develop a diarrhoea, lose considerable flesh and are ten days to two weeks in recovering their former condition.

The period of incubation seems to be about three days. The course of the disease is three to fifteen days. Animals whose mouths are about healed do not seem capable of infesting healthy stock. Animals that have recovered may become reinfected.

The disease does not seem to be a systemic condition. It does not cause a rise in temperature nor any other constitutional disturbances. Of the fifty-nine head of cattle that were quarantined in the Kansas City Stock Yards, and later killed under inspection, fourteen showed mouth lesions. A close search of the carcasses failed to reveal any lesions. The carcasses were passed for food, the heads and tongues alone being condemned.

If horses affected with any of the shipping diseases contracted vesicular stomatitis they usually died. If they had had a chance to recover the stomatitis, making it impossible for them to take nourishment, sealed their fate.

As indicated above a person encountering this disease in cattle and not having the chance to observe or prove that it did not affect feet, did not affect hogs, and *did* affect horses would be justified in considering it highly suspicious for foot-and-mouth disease.

Differential diagnosis between this disease and foot- and-mouth disease:

Does not affect hogs.
Does affect horses.
No foot lesions.

Vesiculars are distinctly different from the typical foot-and-mouth disease vesicals.

Dental pad of cattle not affected.

Piling up of epithelium.

No fever.

Saliva light, usually frothy, seldom ropy, seldom excessive quantities.

Seldom smacking noise so frequently heard in foot-and-mouth disease."

On December 13th, Dr. E. Hogg, of Wilkes-Barre, reported what proved to be Vesicular Stomatitis in mules shipped from Missouri to Elizabethville, Dauphin County. An agent of this Board conferred with Dr. Hogg and confirmed his diagnosis. The affected and exposed animals were isolated and quarantined. Practically all of the mules in the lot contracted the disease, all made good recoveries, premises were cleaned and disinfected and the animals released from quarantine. No native animals contracted the disease from these mules.

On December 14th the following circular letter was sent to all veterinarians of the State:

"Dear Sir:—A disease was recently reported in horses and cattle west of the Missouri River which was very similar to foot-and-mouth disease, so much so that the State Veterinarian of Nebraska and some of the Federal inspectors made a diagnosis of foot-and-mouth disease. For this reason many states and most of the large stockyard company officials placed an embargo against all cloven footed animals that originated in territory west of the Missouri River. Pennsylvania placed an embargo against such livestock from Kansas City and the State of Nebraska.

Dr. R. M. Staley was sent to investigate the disease for our Board. It appears that this disease was recognized first in horses; in most cases in those that were collected for shipment to the European war. Many such cases were found in Calumet Park Stock Yards, Chicago, Illinois. The lesions were confined to the mouths of horses and were nearly identical with those found on the tongues of cattle with true foot-and-mouth disease. No serious consideration was given the disease until it was found in cattle in the stockyards in Kansas City.

In the mouths of cattle the vesicals were chiefly confined to the tongue, lips and hard palate. They were salivated, smacked their lips and so far as mouth lesions were concerned the most experienced and expert diagnostitians were not able to differentiate them from those found in true foot-and-mouth disease.

Agents were promptly sent into Nebraska where these animals originated and it was found that there were a number of cases on each farm. There were more cases in horses than in cattle; swine were not affected. Diagnostic inoculations were promptly made and while it was impossible to transmit the disease to horses and cattle, it could not be produced in swine and sheep and in no cases were the feet of any animals affected.

It was, therefore, decided that the disease was not true foot-and-mouth disease but is what is known as vesicular stomatitis. It is described in Wallace Hore's book on Veterinary Medicine and in the book on Veterinary Medicine by Hutyra and Marek. The disease has never been recognized before in America. It is no doubt transmissible from horses or cattle and vice versa. Veterinarians are urged to be on the lookout for symptoms of the disease, especially in horses or mules brought from the West.

The diseased animals recover in from one to two weeks except a few cases where a secondary infection occurs. The lesions then may continue longer. The patient has some difficulty in eating and as a result loses some flesh. Ordinarily antiseptic mouth wash is all the treatment indicated. Cases of this disease should be reported to the Board, the affected animals isolated and the affected and exposed animals kept under quarantine until recovery takes place. The harness, mangers, stalls, stables, etc., occupied by those having the disease should be carefully disinfected.

The disease has already been recognized and reported in this State by Doctors Edwin Hogg and H. H. Collins.

Very truly yours,
(Signed) C. J. MARSHALL,
State Veterinarian."

Two additional cases of Vesicular Stomatitis were reported during the year; both cases being in shipped horses. Prompt isolation and quarantines prevented the spread of disease to other animals.

LABORATORY

QUAIL DISEASE:

On January 25th we received three hundred quail from Tampico, Mexico. They were immediately transferred to the quarantine station at the State Farm and seventy-eight were found dead on arrival. The next morning approximately thirty more were dead and they continued to die in varying numbers until the entire lot had succumbed. The autopsies conducted on these birds revealed the typical pathological lesions of quail disease, described in B. A. I. Circular No. 109, which is a preliminary report on "Quail Disease in the United States."

HEMORRHAGIC SEPTICEMIA; CATTLE:

One of the diseases which annually causes considerable loss of stock owners and which according to some reports seems to be increasing, is hemorrhagic septicemia. This disease may occur anywhere especially during summer, either sporadically or enzootically and appears to be more prevalent in rainy seasons followed by hot weather, which is favorable for the growth of rank vegetation. Cattle on mountain pastures or on pastures in which swampy land gives rise to this rank growth are apparently more often affected than are animals which graze over well cultivated areas.

In December 1912, Mohler and Eichhorn of the United States Bureau of Animal Industry reported on some work done in immunizing the buffalo herd in Yellowstone Park against hemorrhagic septicemia. One year prior to that date these animals were reported as dying, and autopsies with subsequent bacteriological investigations revealed the presence of B. bipolaris bubalisepticus and established the identity of the disease.

For their work two vaccines were used, the first being prepared by growing the organism five days at 42.5° C., while the vaccine for the second vaccination was attenuated at the same temperature but for only two days. Different preparations of these vaccines after being tested thoroughly on laboratory animals and on sheep were used subcutaneously in the amount of 1 c.c. to the dose. During their experimental work at the laboratories these men also demonstrated by means of the complement-fixation test that vaccinated animals responded after vaccination with the production of immune bodies, and reactions were noted even three months following these vaccinations. At the time they reported these experiments, i. e. one year later, there had been no indications of a recurrence of the disease among the buffalo. In March 1914, Dr. R. R. Clark of Hampton, Virginia, reported favorably on results obtained by him in controlling the disease with a similar vaccine prepared by the Bureau.

With this information at hand it was decided to undertake the vaccination of herds in Pennsylvania from which we had reports by different veterinarians as to the extent of the disease. During experimental studies for the past two or three years it was found that strains of B. bovisepticus recently isolated and grown for but one generation on culture media, while highly virulent for laboratory animals, failed to produce anything more than a slight local swelling when injected subcutaneously in 1 to 2 c.c. doses into calves two to three months of age. This experiment followed previous work done in the attempt to attenuate our strains for vaccination purposes at five and two days with a temperature of 42.5° C. as outlined by Mohler and Eichhorn.

In these experiments vaccine No. 1, grown at 42.5° C. for five days and inoculated subcutaneously into a rabbit in the amount of 0.2 c.c. caused the death of the animal in three days with characteristic lesions of hemorrhagic septicemia. The same vaccine was continued at this temperature, and rabbits injected daily with the same dose, with the result that continued to die up to and including the seventeenth day, after which injections were discontinued. Three attempts to attenuate strains of B. bovisepticus failed, as we were not successful in so reducing the virulence of the strains that rabbits did not succumb to the disease when injected subcutaneously with 0.2 c. cm. The rabbits injected with this amount of vaccine incubated for seventeen days also died on the third day following the injections, with typical lesions of hemorrhagic septicemia.

Having demonstrated that 48-hour cultures of the organism were not virulent for calves when injected in small doses, although killing rabbits in from 18 to 24 hours, it was therefore decided to use a similar culture as a vaccine with the idea that such a vaccine should give a greater and more lasting immunity. The vaccine was prepared as follows: Approximately 100 c. c. of glycerin bouillon was inoculated with one loopful of a strain of B. bovisepticus, the flasks placed in the incubator and grown at 37.5° C. for 48 hours, being shaken every 12-14 hours to insure equal distribution of growth. At the end of this time it was placed in sterile, rubber-stoppered, amber colored glass bottles, ready for shipment with instructions to use 1 c.cm. subcutaneously for cattle and 0.5 c.cm. for sheep. Several veterinarians thoroughly familiar with hemorrhagic septicemia were forwarded the material. The following table shows the number of herds and the number of animals in each herd which were vaccinated:

Herd Number.	Species.	Number of Animals in Herd.	Number Dead Prior to Vaccination.	Number Sick at Time of Vaccination.	Number Vaccinated.	Date of Vaccination.	Number Dead Following Vaccination.	Healthy Animals to Date.
1	Cattle,	170	30	3	140	9—14—15	5	135
2	Cattle,	36	2	0	34	9—20—15	0	34
3	Cattle,	31	4	0	27	9—21—15	0	27
	Sheep,	74	0	0	74	9—21—15	0	74
4	Cattle,	43	3	0	40	10— 2—15	0	40
5	Cattle,	35	1	1	34	10— 4—15	0	34
6	Cattle,	44	0	0	44	10— 4—15	0	44
7	Cattle,	24	0	0	24	10— 5—15	0	24
8	Cattle,	19	2	2	17	1— 5—16	0	17
9	Cattle,	46	1	0	0	....	0	45
10	Cattle,	20	0	1	0	....	0	20
11	Cattle,	18	0	1	0	....	....	18
12	Cattle,	40	7	0	0	....	....	33

Dose for cattle 1 c. c., sheep 0.5 c. c. subcutaneously.

Herd No. 1, of 170 animals, was pastured on a mountain of several hundred acres in which was a swampy area recently cut over by lumbermen and which showed plenty of rank vegetation. Thirty animals had died prior to vaccination. Three were showing clinical symptoms when vaccinated and five died following the vaccination, including the three which were sick. It is not unlikely that had temperatures been taken the other two animals which died would have showed increased temperatures. This was the only herd in which any deaths followed the vaccination, although in herds No. 5 and 12 three sick animals were injected.

In herds No. 2, No. 3, No. 4 and No. 5, the disease was immediately checked without further losses.

Herds No. 6 and No. 7 were on farms adjoining that of No. 5 and were given the vaccine as a prophylatic against the disease.

In herd No. 8 the outbreak was checked and the sick animals recovered following the vaccination.

One animal only was sick and died in herd No. 9.

In herds No. 10 and No. 11 a sick animal in each case was treated with iodine internally and both recovered. No further cases developed nor were they vaccinated.

In the case of herd no. 12 the veterinarian made a diagnosis of anthrax and they were vaccinated for the same, but the deaths continued and the second veterinarian was called and found a typical case of hemorrhagic septicemia. Seven young heifers in the pasture where seven others had died, were sold. No further cases developed nor were they vaccinated. The reports in connection with this herd were incomplete and did not show whether the remaining animals on this farm were exposed to the infection.

In summarizing we find that the total number of animals in the infected herds that were vaccinated was 476; number of animals dead prior to vaccination 42; number animals vaccinated 434; number sick at time of vaccination 6; number of deaths following vaccination 5; leaving a total of 429 healthy at the present time.

It is to be regretted that the last four herds not vaccinated and used as control herds did not develop the disease to a greater extent. This may be due to a mistaken diagnosis or they may simply have been sporadic cases—probably the latter. Meyer believes that a clinical diagnosis is extremely difficult and depends upon autopsies and bacteriological findings. In the case of but two herds only did we have specimens submitted for a bacteriological examination. The others were confirmed by autopsists familiar with the disease.

The herds will be watched during the coming summer for any new cases which may occur and other experiments undertaken in order to further perfect these vaccines and establish if possible the relative values of the immunity conferred.

CONCLUSION

The use of 48-hour cultures of B. bovisepticus subcutaneously in the dose of 0.5 c. cm. for sheep and 1 c. cm. for cattle is harmless.

The immunity conferred by this vaccination has not been thoroughly demonstrated, but the sudden checking of losses in several herds may be evidence of some value. Incubation at 42.5° C. for seventeen days failed to render the strains virulent for rabbits in the dose of 0.2 c. cm.

We are indebted to Drs. Super, Dick, Barnes and Mitterling for the hearty co-operation and records furnished in connection with this work. The results obtained were sufficiently satisfactory to warrant a continuance of the work. During the past year several hundred doses of the vaccine were sent out and care was taken to have the veterinarians receiving same render complete reports on blanks furnished for the purpose. The results were, if anything, more satisfactory than for the year 1915, the mortality falling from 12.5 per cent. to 2.8 per cent. All of the infected herds have been handled by veterinarians familiar with hemorrhagic septicemia and practically all diagnoses were confirmed by autopsy, some also by laboratory examinaaion. The outbreaks occurred in counties where the disease has been more or less prevalent for years. Internal medication with various drugs has been for many years proven of little value.

During the years 1915 and 1916, twenty-five native sick animals were vaccinated, twelve recovered and thirteen succumbed to the disease. In 1916 five sick animals not vaccinated recovered. Twenty-two of the twenty-three sick steers vaccinated in 1916 completely recovered.

In sixteen out of twenty-three native infected herds on pasture, the disease was immediately checked without a single further loss. In five of the seven where deaths occurred following vaccination, animals were sick when vaccinations were made. In the other two herds deaths had occurred prior to vaccination.

One hundred and fifty-six cattle and seventy-four sheep were vaccinated in 1915 on farms which adjoined infected premises with not a single case of the disease reported among them since vaccination.

Ninety (90) per cent. of our outbreaks occurred during August, September and October.

The mortality among infected herds prior to vaccination in 1915 and 1916 was twelve and one-half (12.5) per cent.

10—5—1916

The mortality among *apparently* healthy animals vaccinated in 1915 and 1916 was one and eight-tenths (1.8) per cent.

The total mortality of apparently healthy and sick animals following vaccination was two and eight-tenths (2.8) per cent.

The difference in mortality prior to and following vaccination was nine and seven-tenths (9.7) per cent. (mortality decreased 77.6%).

A living hemorrhagic septicemia vaccine prepared as described has not in any way proved harmful for our field work. Living vaccines providing they do not produce the disease—establish new centers of infection or set up chronic "carriers" are obviously better than dead bacterins.

Experiments thus far have failed to give us a standard animal test for this vaccine, other than that it is virulent for rabbits and guinea pigs but not for sheep and calves.

Shipped steers "feeders" which pass through various stock-yards may develp an infection that they are capable of transmitting to native herd cattle. Vaccination of these herd cattle and the unaffected steers apparently gives good protection.

Twenty-two (22) recoveries among twenty-three (23) vaccinated steers with but twelve (12) recoveries among twenty-five (25) native cattle on pasture seems to indicate a therapeutic value for the vaccine in chronic cases of hemorrhagic septicemia taking the form of pneumonia. This form is seldom seen on pasture in Pennsylvania but instead the acute form.

The absence of a single case of hemorrhagic septicemia in herds since 1915 vaccinations may indicate considerable immunity, but the non-appearance of the disease in part of the unvaccinated 1915 control herds left for 1916 detracts from the value of such a deduction.

Death of a few apparently healthy animals within one week following vaccination seems to indicate that sufficient immunity is not developed within that time to protect. The use of an anti-serum simultaneously with the vaccine may eliminate such losses.

Hemorrhagic Septicemia of Mules: There has for years been a question in the minds of some sanitarians as to the occurrence of hemorrhagic septicemia in equines. In August we received a report of deaths of several mules in Lancaster County due to an unknown cause.

The owner had had mules on his place for the last fifteen years and never experienced any such losses prior to this time. The animals had not been on pasture at all and feed consisted of hay cut from high ground in July; also western corn and oats. The hay was dark stained due to exposure to several rains immediately after cutting, but was entirely free from mould. It consisted principally of clover and the other meadow grasses and appeared reasonably free from weeds.

Case No. 1: On August 11th one of the mules about one year old did not eat well and the next day was entirely off feed with the exception of a little fresh grass which he ate freely and some water which he drank. The animal died on August 12th.

Case No. 12: Was taken sick on Saturday night, August 12th, and the veterinarian who was called examined the animal and gave an unfavorable prognosis. This mule was also about one year of age and the next morning was more restless, falling down and getting up frequently. It was given no medicine and died about two hours after becoming restless.

Case No. 3: Mule about one year of age was noticed to be off feed on the morning of August 14th. That evening it became dull and restless and died during the night.

Case No. 4: The veterinarian who examined case No. 2 was called for this animal and found a severe conjunctivitis also congestion of all visible mucous membranes and from the history of the other cases pronounced an unfavorable prognosis. This animal ate well until the following evening, August 15th, when it went off feed, became restless, getting up and down for several hours before death and died on Wednesday, August 16th.

Case No. 5: Was taken sick on Wednesday evening. The veterinarian who attended the other case found the same general condition. The following day, August 17th, this mule became dull and restless, walked around the stable with staggering gate and on Friday died. Dr. Boerner was present and autopsied the last animal which died and found a typical case of hemorrhagic septicemia with petechiation of serous and mucous membranes, sub-serous hemorrhages and subcutaneous oedema. There was absolutely no pneumonia and Dr. Johnson of Lancaster who had autopsied one of the animals that died previously reports exactly the same conditions.

The remaining animals in the stable consisting of two bay horses about twelve years of age, one black mare eighteen years old, and one bay mare five years old were examined and found to be in every way normal. No indications of increased pulse or respiration, rise in temperatures, conjunctivitis, etc. Specimens collected for laboratory examination enabled us to isolate pure cultures of B. equisepticus from the heart blood, liver and spleen.

None of the literature at hand gives authentic reports on hemorrhagic septicemia of equines and this report is important as it establishes beyond a doubt the existence of such a disease.

Rabies Diagnosis: It has for a number of years been recognized that a histological examination of the "ganglior nodosum" for specific tissue changes rendered valuable aid in the diagnosis of rabies. These tissue changes consist of a cell proliferation evidently from the endothelial cell capsules, with a great croding in upon and invasion of the ganglion cells, which results in atrophy and destruction of these latter cells. The changes may be uniform throughout the entire ganglion and in the advanced stages of the disease this is often the case, or the cells may be localized in district areas with the destruction of the nerve cells only in those areas. Frequently we receive heads for examination which are badly mutilated, decomposed, or from which when the animal is killed, the brain material has been so nearly destroyed that examinations of same are impossible. Realizing the fact that providing the proliferative changes of the ganglia are constant in rabies a greater number of more accurate diagnoses is possible, we examined these ganglia over a period of two years in connection with positive diagnoses of rabies based upon the findings of Negri bodies. In addition to this work, the examination of numerous specimens of brain material from those animals known to have died from other causes was undertaken and the results obtained were regarded as warranting the following conclusions:

1. That "Negri-like" bodies may occur in smear and section preparations from brains of animals dead from other causes than rabies, and also in association with Negri bodies in such preparations from rabic brains.
2. That true Negri bodies are only present in the central nervous tissue of animals which were suffering from rabies at the time of their death.
3. That in all cases submitted for diagnosis the "ganglion nodosum" should be preserved and, in the event of negative brain findings, examined for proliferative changes.
4. That section preparations of the ganglion nodosum showing diffuse or distinct localized proliferative changes warrant a diagnosis of rabies, though other material may be negative or not available for examination (tabular series "a" and "b").
5. That in cases where the brain material is negative and the ganglion shows distinct proliferation, it is probable that the Negri bodies escaped observation, or that the brain, through decomposition, mutilation, or other cause, was unsatisfactory for examination (tabular series "d").
6. That rarely section preparations of the ganglion nodosum may not show proliferative changes, though Negri bodies be present in the brain. Therefore a negative diagnosis should not be based upon a negative finding in the ganglion alone (tabular series "c"—2.2%).

During 1916, a total of only 255 heads were received for examination. Of this number 106 or approximately 45% were positive; 122, 52%, were negative, and 6, approximately 2.5%, were suspicious to the microscopical examinations. Twenty-one heads, mostly received during the summer months, had to be discarded because of improper packing or delay in shipments which resulted in advanced decomposition changes. The number of these specimens shows a slight decrease below the number received in 1915 (295). Prior to that for a period of four years the average number received yearly was about 425, of which 60% were positive cases.

Infectious Abortion of Mares During January and February the veterinarian in charge of a large farm in Berwyn, Chester County, which raises annually a number of thoroughbred colts reported a disease which he suspected of being infectious abortion and forwarded material to the laboratory for examination. While the bacteriological examinations on the first material submitted were being conducted blood samples were taken from fifty-four animals including thirty brood mares. Of these fifty-four, twenty-four were thoroughbred brood mares, twenty-two were light harness mares, three were draft mares and five were stallions.

As a result of the examination of these sera, eight of the thorughbred mares from the brood stables gave reactions to the complement fixation tests and included in these eight reactors were the four mares which had dropped premature foals, or in other words had aborted. By the time the disease was established, others of the thoroughbred foals began to develop hot, painful swellings of the joints.

Several investigators believe the organism causing infectious abortion of mares "B. abortus equi" to be the causative agent of an infectious anthritis of foals and it was deemed advisable to undertake the vaccination of the affected foals. A large amount of work was carried out in connection with this outbreak. Briefly our conclusions are as follows:

(1) The outbreak was due to an infection with the same organism belonging to a sub-group of the para-typhoid enteriditis group, which has caused numerous outbreaks of abortion in mares in both United States and Canada, and which has been isolated by various authorities here and abroad.

(2) The complement-fixation and agglutination tests are reliable for determining the extent of the infection in the stable, but the best results can be obtained by repeating these tests at intervals of three or four weeks. Animals giving an agglutination reaction of 1-500 or over, with no complement fixation reaction, should be watched and retested in three weeks. Immune bodies in some cases disappear rapidly.

(3) One ophthalmic test with the purified "abortin" is of no value in determining the infected animals. Whether or not a different preparation of abortin or a retest, after the eye has been sensitized with one dropping, would give better results, has to be determined.

(4) The fact that all of the colts, either infected or later developing affections of the joints, gave marked local reactions to the bacterin may indicate such a preparation to be of diagnostic value when injected or rather vaccinating foals against joint evil, which do not at the time give serum reactions.

(5) Vaccination of exposed foals with a specific bacterin appears to confer some immunity to the disease, and may also have some curative properties, as seven out of ten foals, either thoroughly exposed to the infection, or badly infected, failed to develop or completely recovered from a severe attack of infectious arthritis. Owing to the fact that we were unable to try the vaccine on a large number of animals experimentally, we hesitate to base our conclusions too strongly on results obtained, and they should be confirmed.

(6) It appears to us that two or three injections of 50,000,000 to 100,000,000, organisms, followed by more if necessary, would be much better than numerous injections of small amounts as given by us, and we also feel that if we had given continuous injections of this bacterin to two of the three foals mentioned in the following paragraph, both would have been saved.

(7) Of the three foals not saved, foal No. 35, had been sick for over three weeks and died after the fourth injection; another, No. 34, received only 88,000,000 organisms and the condition was aggravated by a profuse diarrhea and prolapse of the rectum, while the third, No. 52, received but 40,000,000 bacteria and did not develop articular swellings until seven weeks old. The other foals (except No. 34, 40 days) developed in from 20 to 23 days of age.

(8) The thoroughbred mares and foals in this outbreak appear to be much more susceptible than the Hackney and draft mares and foals exposed, although we recognize the fact that another season may show the infection in these also.

(9) Information received regarding the aborting mares in the stud reported by Meyer and Boerner in 1913, shows that the following year all dropped healthy foals, while another mare purchased and added to the stable aborted in 1914. This would indicate an acquired immunity in aborting mares, also that one or more of them continued to spread the infection.

In the outbreak herein reported the source of infection could not be determined, nor did the records point to any one stallion on the farm as having carried or spread the infection. As the colts were born, the navel was carefully treated and tied. There seems to be little doubt that the infection of the foals may occur in utero, as we are also inclined to believe there is a strong possibility of a feeding infection, due to the stable becoming contaminated with the infective discharges.

Infectious Abortion of Cattle: The laboratory has undertaken nothing new during the past year in experimental study of this disease as previous investigations have brought us to a point where such study involves the outlay of a considerable amount of money and this has not been available. We are always prepared to render diagnoses on specimens received, either for bacteriological or serological examination. It is now recognized that the serological examinations are of value chiefly in establishing the approximate extent of the infection in a herd. With this information at hand, owners are able to isolate suspicious reactors and better apply the prophylactic measures which at the present time are our only means of abating and controlling this disease.

Positive reactions do not necessarily mean that the animal is actively infected nor that she is disseminating this infection to animals with which she may come in contact. On the contrary, it may indicate a partial or total immunity, in which case she is of more value than the non-reactors which have never been infected, and should be retained. All investigations to the present time point strongly to the fact that herd owners should raise their own stock and not dispose of the aborting animals. A new infection in a susceptible herd may result in large losses for the first or second year unless stringent methods of control are inaugurated, but if these animals are retained, the living calves raised and no new females introduced, the infection will gradually die out or the animals acquire sufficient immunity that the owner, with a little help and the exercise of care on his part, may practically eliminate all such losses. To the best of our present day knowledge, the so-called abortion cures are worthless. The control of this disease along certain sanitary lines has in numerous instances met with marked success, in some few herds even to the point of eliminating abortion entirely. Seventeen specimens of foetuses, foetal placentas, etc., were received for bacteriological examination of which five were reported as positive, eleven suspicious and one negative. A total of four hundred and twelve (412) sera were examined serologically by means of the complement fixation and agglutination tests.

Anthrax: Following the results published by the Bureau of Animal Industry concerning Eichhorn's work in his application of Sobernheim's method of treatment in the control of this disease, it was deemed advisable to undertake the production of an anti-anthrax serum. This was accordingly done and, after numerous unavoidable delays, we are prepared to furnish the anti-anthrax serum and a spore vaccine for simultaneous use on all non-infected animals. The following directions for its use will accompany all shipments of this material for the year 1917:

DIRECTIONS FOR USING ANTI-ANTHRAX SERUM AND VACCINE

READ CAREFULLY

Vaccinations against anthrax this year will be carried out with the serum and vaccine—BOTH INJECTED THE SAME DAY—and doing away with the need of a second vaccination twelve days later.

Inject all animals with anti-anthrax serum first—DOSE 10 C.CM. EACH—subcutaneously on one side of neck.

Then inject immediately all animals with anthrax vaccine—DOSE 1 C.CM. subcutaneously on opposite side of neck.

DO NOT INJECT SERUM AND VACCINE ALTERNATELY unless two (2) syringes are used—one for serum and one for the vaccine.

Use the usual aseptic precautions and carefully destroy all unused anthrax vaccine.

Infected animals, i. e., those animals in the herd which are running high temperatures or showing other clinical manifestations of anthrax infection should be treated with *serum alone* in the amount of fifty (50) c.c. intraveneously.

During the year just past anthrax vaccines No. 1 and No. 2 were employed for the control of the disease with the uniformly good results which have followed this form of treatment for a number of years past.

Nineteen specimens were received at the Laboratory for examination, nine of which were reported as positive after isolating the anthrax bacillus and confirming the diagnoses by animal inoculations. One of he positive cases was from a hog, all of the other specimens from bovines.

Tuberculosis: A total of thirty-nine specimens were received of which twenty-one proved positive either by microscopical examination of smears or sections or by animal inoculations. Experimental work has been confined to the study of reactions in connection with the different tests applied, using subcutaneous, retest, special retest, ophthalmic, intradermal or intradermal-palpebral injections of tuberculin.

Hog Cholera: During the year thirty-four shipments were received for diagnosis of this disease. Nineteen of this number were diagnosed as positive, six were suspicious and nine were entirely negative. In the majority of the negative and suspicious cases the entire carcass was not received and the specimens submitted were not of a nature to allow a complete examination. Sufficient hog cholera serum was produced to supply all demands and the results obtained were very good.

Glanders: A total of 3,930 sera from horses and mules were received and examined by means of the complement fixation and agglutination tests, two hundred and thirty (230) of these proved positive and fifty-eight (58) gave incomplete or suspicious reactions necessitating retests or the application of the ophthalmic test. These incomplete reactions were chiefly encountered in examination of mule sera which gives an atypical reaction to the complement fixation test and they were considered suspicious or held for retests on account of the exceptionally strong reactions encountered. In addition to these examinations, a large number of specimens of suspected glanders tissue or pus were received. The experimental study of nodules or lesions collected at the autopsy of reacting animals has proven very interesting and served not only to show that the serum tests are the most accurate means we have for the diagnosis of glanders, but that other nodules, often parasitic may easily be confused with the true glanders lesions at the post-mortem table.

Poultry: The increased value and attention given to the production of poultry and eggs behooves all to give some thought and study to the diseases encountered in this industry. The diseases affecting fowls are numerous but are, with few exceptions, readily amendable. The following case received during the latter part of November is of interest:

LIVER LESIONS IN FOWL CHOLERA

Specimen No. 7843—Three turkeys (dead).

History: Dealer purchased large number of turkeys for holiday trade. Twenty-four hours after getting them home found several dead. Purchasers of the live birds began to return dealer the dead fowls. Veterinarian called submitted several for examination. Autopsies on all three were practically identical as follows:

Autopsy: Lungs edematous; pericardial sac contained excessive amount of serous fluid; pericardium and epicardium showed petechiae and ecchymoses; spleen swollen and congested; liver congested and presented innumerable small yellow foci throughout resembling avian miliary tuberculosis but too small to be easily confused with lesions of entero-hepatitis. On section appeared microscopically as small infarcts.

Intestinal tract inflamed throughout entire length with excessive reddening of mucous membrane in small areas. Caeca inflamed and showed in lower portion several small tumefications with thickened mucous membrane and increased redness. Small amount of fluid in peritoneal cavity.

Smears from heart blood, spleen and yellow liver foci showed typical bipolar organisms in large numbers.

Cultures examined twenty-four hours later showed pure strains of B. avisepticus.

Animal inoculations on hens, rabbits and guinea pigs resulted in death of all in from twenty-four to forty-eight hours. Hens showed typical lesions of fowl cholera on autopsy including the liver lesions. One guinea pig and one rabbit showed the same liver lesions.

Histological sections of liver showed microscopically cloudy swelling—congestion and small areas of necrosis containing masses of bipolar bacilli.

The finding of liver lesions and inflamed caeca in turkeys may confuse it with entero-hepatitis unless a bacteriological examination is made, therefore this report.

The number and kind of fowl with the diagnosis established are shown in a separate table.

SUMMARY

During the year 1,205 shipments containing over 5,000 specimens of different kinds were received for diagnosis. This number shows a marked increase both in number of shipments and specimens over the preceding year. A table showing the source of these specimens for each month will be found at the end of this report. In addition to the work already mentioned examinations were carried out on a large number of specimens with the result that we encountered a variety of conditions and diseases which we are unable to place in any particular group. These have been drawn up in a table showing the source and diagnosis rendered. We have omitted, however, such specimens as water samples, milk samples, museum, food and experimental specimens of which there were about one hundred. In addition to this table, we have also appended a table showing material examined for the various parasitic diseases. A glance at this table will show that whereas thirteen specimens of skin scrapings from horses were submitted for a diagnosis of mange, we were able to render but one such positive diagnosis. This may be due to one of two conditions, either that mange in horses infrequently occurs in this State or that veterinarians submitting skin scrapings are not cognizant of the fact that the form of this disease encountered in equines is usually sarcoptic, the mange parasites burrowing beneath the epiderm. This makes it necessary that scrapings be taken not from the centre of the area of crusts or scabs which may have formed, but near the periphery, in which direction the parasites are probably burrowing. These scrapings should also be deep enough to remove the epiderm even though little blood spots may afterwards appear.

Still another table is appended showing the source of specimens in connection with rabies diagnosis.

BIOLOGICAL PRODUCTS

A table is appended showing the number of doses of the various tuberculins, malleins, serums and vaccines distributed for the year 1916. The work involved in the preparation and distribution of 54,968 doses of the tuberculins, 11,265 doses of mallein, 532,280 c.c. hog cholera serum, 2,905 doses of anthrax vaccine, 1,060 doses hemorrhagic septicemia vaccine and the autogenous vaccines, occupied the greater portion of the time of three men, necessitated handling, washing and sterilization of an enormous amount of glassware and the preparation of a large amount of culture media. We have looked over prices quoted by various commercial houses for these products, taken an average of those at hand, and have submitted a table showing that the value of the products distributed, according to this method of determination, was $15,428.59. In a like manner we estimated the value of diagnoses rendered on something over 5,400 specimens received and find that this amounts to $18,575.00, giving a total value of $34,003.59.

Exclusive of this, we have the inestimable value of different experiments carried on during the year in the study of the various contagious diseases, e. g., development of a vaccine to be used in the control of hemorrhagic septicemia of livestock. It is safe to say that without facilities for carrying out tuberculin tests, studying different diseases, and administering prophylactic vaccines and serums, the losses to the livestock industry of this State would run into millions of dollars.

In looking over these tables it will be noted that hog cholera serum has not been included as a laboratory product, but has been figured as a production from the State Experimental Farm on which the hog cholera serum plant is located. The value of this serum alone, if sold at two cents per c.c., would be $11,707.60. Some firms are putting on the market anti-hog cholera serum at one and one-half cents per c.c. but with the increased cost of food, labor, the value of hogs, etc., we feel that a better serum can be made for the price as estimated by us. In connection with the value of services rendered in the examination of 4,676 sera during the past year we estimate these at $3.00 each, whereas for the years 1914 and 1915 such diagnoses were estimated at $5.00.

SOURCE OF SPECIMENS RECEIVED DURING YEAR

	Horses.	Cattle.	Sheep.	Goats.	Swine.	Deer.	Elk.	Dogs.	Cats.	Turkey.	Pigeon.	Chicken.	Duck.	Quail.	Rabbit.	G. Pigs.	Muskrat.	Spider.	Mantis.	Man.	Total.
January,	55	147	....	....	5	....	....	17	1	....	....	5	....	57	....	2	....	....	....	1	290
February,	33	27	....	....	2	....	....	17	....	....	....	7	....	21	....	4	....	....	....	....	111
March,	121	9	6	....	6	1	....	22	....	....	....	6	....	6	....	4	1	....	....	....	182
April,	114	42	....	2	2	....	1	25	....	....	....	3	....	....	....	4	....	....	....	....	193
May,	64	47	....	....	3	....	....	26	2	....	....	4	2	1	....	....	....	....	....	....	149
June,	217	22	....	....	2	....	....	27	1	....	....	9	....	....	....	....	....	....	....	....	278
July,	202	132	1	....	1	....	....	26	....	....	2	5	2	....	4	....	....	....	....	....	375
August,	331	15	....	....	3	....	....	18	2	....	....	....	1	....	....	2	....	1	....	....	373
September,	849	34	....	....	5	....	....	15	1	1	....	....	1	....	4	....	....	....	1	....	911
October,	1,167	16	....	....	16	....	....	17	....	....	....	....	....	....	1	2	....	....	....	....	1,219
November,	679	73	....	....	2	....	....	15	1	3	....	....	....	....	1	3	....	....	....	....	777
December,	462	34	....	....	4	....	....	13	1	....	....	....	....	37	....	3	....	....	....	....	554
Total,	4,294	598	7	2	51	1	1	238	9	4	2	39	6	122	10	24	1	1	1	1	5,412

RABIES

Animal.	Jan.		Feb.		March.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		Total.
	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	
Horse,	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Cow,	....	1	....	....	....	....	....	1	....	....	....	....	1	....	....	....	1	1	....	....	....	....	....	....	5
Hog,	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	3
Dog,	6	10	6	10	12	10	14	11	14	11	10	10	6	16	2	14	5	6	6	8	11	4	8	1	211
Cat,	1	....	....	....	....	....	....	....	....	2	....	1	....	....	....	1	1	....	....	....	....	1	....	....	7
Child,	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Total,	8	12	6	10	13	10	14	12	14	13	10	11	7	16	2	15	7	7	6	10	11	5	8	1	228

Discarded 20 dogs heads—1 cat head.
Suspicious 6 dogs heads.

PARASITES

Material.	Parasite.	Diagnosis.	Horse.	Ox.	Sheep.	Dog.	Cat.	Rabbit.	Elk.	Pigeon.
Carcass,	Ascaris marginata,	Ascariasis,	......	......	......	1	......	......	......	......
Carcass,	Oesophagostoma Columbianum,	Nodular disease,	......	......	3	......	......	......	......	......
Abdominal viscera,	Oesophagostoma Columbianum,	Nodular disease,	......	......	1	......	......	......	......	......
Intestines,	Oesophagostoma Columbianum,	Nodular disease,	......	1	......	......	......	......	......	......
Worms,	Ascaris mystax,	Ascariasis,	......	......	......	......	1	......	......	......
Head,	Psoroptes communis, var. cuniculi,	Otacariasis,	......	......	......	......	......	1	......	......
Carcass,	Coccidium oviforme,	Coccidiosis,	......	......	......	......	......	6	......	......
Carcass,	Heterakis inflexa,	Ascariasis,	......	......	......	......	......	......	......	2
Ticks,	Dermacentor electus,		......	......	......	......	......	......	1	......
Skin scrapings,	Sarcoptes scabiei,	Sarcoptic scabies,	1	......	......	......	......	......	......	......
Skin scrapings,	None,	Neg. to parasites,	12	......	......	......	......	......	......	......
Skin scrapings,	None,	Neg. to parasites,	......	3	......	......	......	......	......	......
Spider,	Argiope riparia,	Non venemous,	......	......	......	......	......	......	......	......
Insect,	Phasmomantis carolina.									

POULTRY

Diagnosis.	Quail.	Ducks.	Turkeys.	Chickens.	Pigeons.
Bacillary Diarrhoea,				5	
Circulatory trouble,				1	
Catarrhal,				1	
Enteritis Ulcerative,	1			1	
Food Poisoning,		2			
Fowl Cholera,			3	7	
Gastro-enteritis,				1	
Heterakis Inflexa,					2
Odema, Lungs,				5	
Peritonitis,				2	
Quail Disease,	122				
Streptococci Infection,				4	
Tuberculosis,				3	
Diagnosis not established,				1	
Decomposed and discarded,	3			5	

MISCELLANEOUS SPECIMENS INVESTIGATED BY LABORATORY DURING 1916.

Diagnosis.	Horse.	Ass.	Mule.	Cow.	Calf.	Hog.	Dog.	Cat.	Rabbit.	Guinea Pig.
Abortion (bovine):										
Bacteriological Examination Positive,				5						
Bacteriological Examination Suspicious,				11						
Bacteriological Examination Negative,				1						
Abortion (equine):										
Bacteriological Examination Positive,	4									
Bacteriological Examination Negative,	3									
Adeno Cystoma (Ovary),				1						
Actinomycosis:										
Bacteriological Examination Positive,				2						
Bacteriological Examination Negative,				1						
Black Leg—Bact. Exam. Neg.,				1						
Calf Cholera,					3					
Coccidiosis,									6	
Cystic Ovaries,				1						
Enteritis (catarrhal),							2			
Enteritis (Chronic Productive),								1		
Gastro Enteritis,						1	1			3
Gastritis,		1				1				
Glanders tissue (sections positive),	8									
Glanders tissue (sections suspicious),	4									
Glanders tissue (sections negative),	9									
Granular Venereal disease,				1						
Hemorrhagic Septicemia:										
Bacteriological Examination Positive,				1						
Bacteriological Examination Suspicious,				1						
Bacteriological Examination Negative,				1						
Hemorrhage (Internal),							1			
Johne's Disease:										
Bacteriological Examination Positive,				1						
Bacteriological Examination Negative,				7						
Mange:										
Bacteriological Examination Positive,	1									
Bacteriological Examination Negative,	11			3						
Mastitis, streptococci,				3						
Meningitis, Tubercular,				1						
Metritis, septic,									1	1
Multibacterial Infection,	3			1						
Nephritis, Parenchymatous,	1									
Nephritis, Purulent,	2					1				
Plaques Glycogeneque,				1						
Pyocyaneous Infection,										1
Poisoning (lead),				1						
Parasitic Nodule,	1									
Peritonitis,							1			4
Pneumonia,	1								1	4
Sarcoma (spindle celled),	1									
Sporothricosis—Bact. Exam. Neg.,	2									
Staphylococci Infections,	2						2			
Streptococci Infections,	1									
Toxemia,					1		1			2

AMOUNT OF BIOLOGICAL PRODUCTS SENT OUT 1916

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.	
Tuberculin (0.4%),	3,150	2,427	2,815	2,407	3,455	2,414	1,514	4,575	7,278	5,512	3,303	3,562	42,432	Doses.
Tuberculin retest and special retest,	397	128	131	192	805	693	763	797	965	950	162	865	6,848	Doses.
Tuberculin (Ophthalmic),	47	1	117	102	798	289	278	110	817	907	682	461	4,729	Doses.
Tuberculin (Intra Dermal),	102	100	61	50	10	40	150	115	300	6	....	25	959	Doses.
Mallein (Ophthalmic),	724	798	945	1,466	822	3,443	338	166	1,187	308	504	561	11,262	Doses.
Mallein (Intra Palpebral),	....	....	....	....	....	....	3	....	....	....	....	....	3	Doses.
Anti Hog Cholera Serum,	60 910	14,010	36,550	35,480	48,300	9,340	21,950	42 120	82,270	109,410	38,840	33,100	532,280	Ccm.
Anthrax Vaccine,	134	15	320	995	705	....	20	58	193	125	65	274	2,905	Doses.
Blackleg Vaccine,	....	30	2,795	2,095	1,730	....	1,110	....	....	365	....	445	8,570	Doses.
Hemorrhagic septicemia vaccine,	19	....	....	....	....	12	50	176	659	106	38	....	1,060	Doses.
Autogenous Vaccines,	3	2	2	....	....	....	2	....	....	....	....	2	11	

VALUE OF BIOLOGICAL PRODUCTS DISTRIBUTED.

Mallein (ophth) 11,262 doses@27 cents,	$3,040 74	
Tuberculin (subcut) 42,432 doses@15 cents,	6,364 80	
" (retest) 6,848 doses@50 cents,	3,424 00	
" (intradermal) 959 doses@10 cents,	95 90	
" (ophthalmic) 4729 doses@35 cents,	1,655 15	
Anthrax vaccine (No. 1 and2) 2,905 doses@20 cents,	581 00	
Hemorrhagic septicemia vaccine, 1,060 doses@20 cents,	212 00	
Autogenous vaccines, 11 doses@$5.00 each,	55 00	
	$15,428 59	$15,428 59

ESTIMATED VALUE DIAGNOSES RENDERED.

412 cow sera (Inf. abortion)@$3.00,	$1,236 00	
3,930 horse sera (glanders)@$3.00,	11,790 00	
334 horse sera (Inf. abortion)@$3.00,	1,002 00	
255 heads rabies@$10.00,	2,550 00	
34 hog cholera@$2.00,	68 00	
39 tuberculosis@$5.00,	195 00	
19 anthrax@$2.00,	38 00	
167 fowl@$5.00,	66 00	
33 parasites@$2.00,	66 00	
17 infectious abort. (cows)@$5.00	85 00	
142 miscellaneous@$5.00,	710 00	
	$18,575 00	18,575 00
		$34,003 59

ANTI-HOG-CHOLERA SERUM PRODUCTION, YEAR ENDING DECEMBER 31, 1916

No. Hog.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct	Nov.	Dec.	Total.
4130,	900									4,100	4,400	8,900	18,300
4972,	4,000	8,150											12,150
4043,	4,500	9,100			4,950	4,500							23,050
4050,	3,600												3,600
4066,	3,850	7,850			8,700			9,400					29,800
4045,	4,150	8,600			8,500			9,000					30,250
4020,	4,750				1,600	4,950				5,800	1,000		18,100
4062,	3,750	8,650											12,400
4046,	4,500	9,650			9,950								24,100
4037,	3,600					6,550	2,050						12,200
4048,	4,900	1,500				2,250	5,750				8,850		23,250
4025,	5,300	1,800			8,500	1,800	6,950						24,350
4120,	6,350	2,300			4,250	4,450							17,350
4996,	6,200	2,100											8,300
4994,	6,650	1,800											8,450
4954,	4,700	1,900											6,600
4030,	6,050	2,250			4,900	4,500							17,700
4064,		7,350			8,900								16,250
4067,					8,500	4,400	4,600						17,500
4122,					2,200								2,200
4063,					8,650		7,500	2,150					18,300
4044,					8,750	2,150	6,500						17,400
4047,					8,150	2,100	6,400						16 650
4121,					7,700							7,000	14,700
4052,					6,000	2,100		2,400	6,300	7,000	2,000		25,800
4060,					3,800	3,950		8,450					16.200
4084,					4,200	4,150							8,350
4069,					3,850	3,750							7,600
4123,					1,350	4,350	5,950				6,000		17,650
4153,						1,150	4,450	1,500	4,600		7,750		19,450
4189,						1,150	4,000				3,900	3,850	12,900
4071,							5,950	1,800					7,750
4267,										3,080	900		3,980
4183,											7,400	3,850	11,250
4184,											7,350	5,950	13,300
4168,											8,100		8,100
4272,											6,450		6,450
4274,											6,050		6,050
4173,											5,350	1,800	7,150
4170,											5,350	1,800	7,150
4243,											4,650	1,550	6,200
4232,											4,750	1,700	6,450
4258,											4,350	1,600	5,950

4242,	....	....	....	....	....	....	....	....	....	....	3,500	3,800	7,300
4259,	....	....	....	....	....	....	....	....	....	....	....	6,370	6,370
4172,	....	....	....	....	....	....	....	....	....	....	....	6,400	6,400
4262,	....	....	....	....	....	....	....	....	....	....	....	6,250	6.250
4174,	....	....	....	....	....	....	....	....	....	....	....	5,750	5.750
4260,	....	....	....	....	....	....	....	....	....	....	....	6,050	6.050
4245,	....	....	....	....	....	....	....	....	....	....	....	5,200	6.200
4261,	....	....	....	....	....	....	....	....	....	....	....	2,800	2,800
4289,	....	....	....	....	....	....	....	....	....	....	....	2,750	2,750
Total,	77,750	73,000	....	....	123,400	58,250	60,100	34,700	10,900	19,980	98,100	84,370	640,050

Amount of anti-hog -cholera serum on stock December 31st, 1915,	132,300
Amount of anti-hog-cholera serum produced during year 1916,	640,550
Total,	772,850
Amount of anti-hog-cholera serum disposed of during year 1916,	585,380
Amount anti-hog-cholera serum on stock December 31st, 1916,	187,470

Value of Hog Cholera Serum distributed 1916—585,380 c. cm. at 2 cents per c. cm., $11,707.80.

EXPERIMENTAL ANIMALS FURNISHED THE LABORATORY BY THE STATE FARM

Species.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Guinea pigs,	30	12	29	14	....	12	20	15	25	20	40	25	242
Rabbits,	....	....	....	....	....	....	8	....	....	....	....	....	8
Calves,	....	....	1	....	1	....	....	....	....	1	1	....	4
Chickens,	4	....	....	....	....	....	....	....	....	...	....	....	4

SOLD TO ABBATOIRS

Hogs,	....	....	....	....	6	6	....	11	....	6	5	....	34

Value—Guinea pigs 242 at 80 cents pair,	$96 80
Value—Rabbits, 8 at $1.25 pair,	5 00
Value—Calves, 4 at $20.00 each,	80 00
Value—Chickens, 4 at $1.25 each,	5 00

TUBERCULOSIS

It is estimated that the annual losses in the United States from tuberculosis in cattle and hogs amount to $25,000,000. This disease stands prominently at the head of the destructive diseases in this country. The losses from year to year vary but little. A number of breeders and dairymen in Pennsylvania are using every precaution in trying to rid their herds of the disease and some are meeting with good results. Others are less fortunate and many discouraging experiences have been met. The percentage of those making an intelligent effort to control the disease is small in comparison to those who are doing practically nothing in this line.

Recently a herd of 162 animals were examined and tested with tuberculin and 133 of them failed to pass the test and showed the disease on autopsy, and fifteen were so badly diseased that the carcasses were condemned as unfit for food. The results in this herd were not a rare exception. In many herds where a regular, careful physical examination and tuberculin test is made, the losses are much less. In many of our herds where the recommendations of the Board have been followed closely for controlling the disease, the losses have been reduced to practically nothing.

More attention has been given during the past year to the condition of worn out dairy cows—those known in the trade as "bologna cows" or "canners." One of the large packing plants found that a majority of such animals purchased in the State and slaughtered during the year were tuberculous. 25% of them were condemned by the Federal Government as unfit for food. 3,500 such cows were sold for food at one of our large stockyards during the year and were slaughtered with or without proper inspection. Judging from the large amount of tuberculosis in this class of cattle, we believe that it would be much better for the owners and consumers as well, if the disease were discovered before it became so far advanced and the animals so extensively emaciated. It is believed also that all such cattle should be slaughtered under either Federal or State supervision. In a lot of 143 such cattle slaughtered under State supervision during the year, 58 were found to be tuberculous.

All herd owners should be extremely careful in purchasing new animals and in cleaning and disinfecting their stables in which tuberculous cattle have been found. One of the most prolific methods of spreading tuberculosis in hogs and cattle is brought about by feeding skim milk, seperator slop, etc., which is returned to the farmers by creameries. One tuberculous herd supplying a creamery may in this way contaminate a large percentage of the swine and cattle in that community. The law requires that such milk should be heated to 178° Fahrenheit before it is returned to farmers as food for calves and swine. Some of the most progressive creamerymen are complying with this law; many others evade it. Those interested in the health of cattle and swine should insist on having this law enforced and if they are not sure that such milk is properly pasteurized, it should be heated to the required temperature at home before it is used for this purpose.

Much good has come to animal husbandry through such agencies as pig raising contests, livestock judging contests, and cow testing associations. If organizations of this kind could be formed to look after the elimination of tuberculosis and each member do his part in building up a healthy herd, much more rapid progress might be made in controlling the disease.

As a dairy State, Pennsylvania stands seventh in the United States. We have 23,876 pure bred cattle recorded. Our records show that 6,046 native cattle above the age of six months were sold to parties outside of the Commonwealth last year. We should make a greater effort to raise more cattle. Under present conditions, we are purchasing many more cattle than we can sell. Our breeders and dairymen should not be compelled to go outside of the State to purchase cattle. Our records show that 25,160 head of cattle were imported into the State during the year for purposes other than slaughter. 1.43% of them were condemned for tuberculosis. The percentage of reactors was much less than our native cattle. The small percentage is probably due to the careful selection.

6,253 head of cattle were tested during the year at the Lancaster Stockyards and of this number 4,526 were bulls and heifers between the ages of six months and two years, to be used for feeding purposes. The condemnations amounted to about 2%. 4,719 head of cattle were tested during 1916 at the Pittsburgh Stock Yards, the condemnations amounting to about 1%. During the year a testing station was established at Greencastle for animals brought for sale to that point. Between 6,000 and 7,000 head of cattle were handled at this point during the year.

Some of our breeders and dairymen have met with very disagreeable results during the past year in controlling tuberculosis. In nearly all cases, it has been possible to account for the bad results. In most cases it has been shown that the regular annual testing had been discontinued. In other cases, the owners have been careless or deceived in purchasing new animals. During the previous year, very little tuberculin testing was done on account of the prevalence of foot-and-mouth disease. Many herd owners who were in the habit of having the annual test were advised that the Board did not deem it wise to continue tuberculin testing while foot-and-mouth disease was prevalent, fearing that the disease might be spread in this way. Tuberculosis made remarkable headway in certain herds as a result of the lack of activity. On account of the large amount of money required to fight foot-and-mouth disease, it became necessary early in the year to discontinue paying indemnity for cattle destroyed on account of tuberculosis. This fact was also discouraging to many who had been making an honest effort to control the disease. It was surprising, however, to learn that more tuberculin testing was done during the year 1916 than in any one year except 1911, since this manner of controlling tuberculosis was adoptedy by the State. The average percentage of condemnations increased over the previous year by 4.91%.

It has been recognized for a number of years that many tuberculous cattle would not react to the tuberculin test. While the disease is found in about 98% of the animals condemned by this test, the percentage of those having the disease that do not react to it is more than is generally accepted. Many discouraging results can be accredited to the lack of the usual tuberculin test to reveal the presence of the disease in those that may have it more or less extensively. Considerable work was done during the year to determine more accurate methods for detecting those that were affected with tuberculosis. Rather extensive experiments have been made with what is known as the intradermal tuberculin test, the ophthalmic tuberculin test, the subcutaneous retest and the subcutaneous special retest. Results have shown that the most satisfactory method of all is the ordinary subcutaneous tuberculin test. When a considerable number of animals react to this test in the herd, it has been found advisable to follow it up with a combination of the other tests. It is surprising to learn how many tuberculous animals will be found by this method of testing. In former times, it was customary to account for the many cases of tuberculosis that passed the ordinary test as being due to incompetence, carelessness, or dishonesty. It is known now that a large number of such cases cannot be accounted for in such ways.

The Board has had full control in handling tuberculosis in seven large breeding herds during the year. The owners have cooperated in every way possible to assist in freeing their herds from the disease. The plan of using the several tests has been experimented with carefully and results have been gratifying in most cases. We are satisfied that those who depend upon the ordinary subcutaneous test for eliminating tuberculosis or controlling the disease in infected herds, are doomed to disappointment and something more must be done if satisfactory results are ever obtained.

We realize more and more that the subject of tuberculin testing should not be undertaken except in herds where the owner is in full sympathy with the test and is equipped and perfectly willing to comply fully with the requirements of the Board. Discouraging conditions will often be met where the fullest co-operation exists between the Board and the owner, yet it has been shown beyond doubt that profitable results can be obtaind if regulations and requirements are strictly followed. We recommend fully to such owners the importance of fighting tuberculosis in this way. To those who are skeptical or not equipped, this method of controlling the disease will prove a failure in a great majority of cases.

On account of the exorbitant price of dairy cattle, some more economical method should be followed for handling reacting cattle that show no physical symptoms of the disease. For a number of years, it has been customary to slaughter such animals. Since it has been learned that the milk from reacting cattle that show no physical symptoms of the disease can be pasteurized and used safely, there is much less prejudice against keeping animals of this kind and many of them will prove profitable dairy cows for several years. Such animals may spread the disease to other cattle. For this reason they should be kept isolated and recorded with the State so that they may not be sold to infect other herds. But the Board is fully aware of the fact that it is much more reasonable and profitable to keep such animals under proper supervision and use them for dairy and breeding purposes than it is to slaughter them.

The Board has been making an extra effort during the year to control tuberculosis in herds belonging to State Institutions. The tests are made by our agents upon request at the expense of the Board. This work should be continued for demonstration purposes if no other. The disease has been controlled in a profitable way in several of the State Institutions. If it can be continued in a profitable manner, this should be a good object lesson to private herd owners for controlling the disease in their own herds.

The following table shows the records of tuberculin tests for the past year:

"NATIVE TUBERCULIN TESTING"

Year.	No Herds Tested.	No. Cattle Tested.	No. Reactors.	No. Herds Free.	% of Reactors.
1896,	432	5,430	1,191	187	21.9 —
1897,	626	7,613	1,099	298	14. 4—
1898,	582	6,516	1,062	220	17.8 —
1899,	429	6,443	1,107	158	17.1 —
1900,	651	8,478	1,314	254	15.5 —
1901,	545	8,663	1,203	235	13.8 —
1902,	375	6,066	1,024	142	16.8 —
1903,	337	5,573	1,060	132	19.02—
1904,	323	5,159	891	114	17.04—
1905,	529	7,774	1,179	290	15.1 —
1906,	733	7,079	901	283	13.8 —
1907,	403	7,153	950	177	13.2 —
1908,	501	7,083	1,037	264	14.6 —
1909,	731	9,942	1,440	410	14.4 —
1910,	1,055	13,288	1,810	617	13.6 —
1911,	1,109	13,403	1,334	685	9.95—
1912,	1,534	20,534	2,424	898	11.31—
1913,	1,308	17,101	1,346	931	7.87—
1914,	1,252	15,901	1,077	900	6.77—
1915,	880	13,177	879	672	6.82—
1916,	1,272	19,244	1,996	870	10.37—

GRAND TOTAL.

Year.	No. Herds Tested.	No. Cattle Tested.	No. Reactors.	No. Herds Free.	% of Reactors.
21,	15,635	211,554	26,324	8,716	12.44—
Average per year,	744—	10,744	1,253—	415	....

POST-MORTEM REPORT FOR THE YEAR 1916

Number Reacting Cattle.	Final Disposition of Reacting Animals. Autopsies. Visible Lesions.	Autopsies. No. Visible Lesions.	Reactors Not Posted.	Disposition of Carcasses. Reactors. Passed For Food.	Disposition of Carcasses. Reactors. Tanked.	Final Disposition of Animals Condemned on Physical Examination. Number Condemned on Physical Examination.	Autopsies. Visible Lesions.	Autopsies. No. Visible Lesions.	Condemned on Physical Examination Not Posted.	Disposition of Animals Condemned on Physical Examination. Passed For Food.	Disposition of Animals Condemned on Physical Examination. Tanked.
1,955, ...	1,336	80	539	1.156	261	41	35	3	3	8	30

NOTE:—Twenty (20) cattle killed by owner—Six (6) died on premises—One (1) lost—One (1) sold for experimental purposes.

OPHTHALMIC TESTS APPLIED TO NATIVE HERDS

January 1, 1916, to December 31, 1916

County.	No Herds Tested.	No. Cattle Tested.	Results. No. Passed.	Results. No. Condemned.	Disposition.
Allegheny, ...	3	267	96	171	150 killed—21 in quarantine.
Bucks, ...	3	255	204	51	49 killed— 2 in quarantine.
Centre, ...	1	63	36	27	21 killed.
Dauphin, ...	12	414	263	141	52 killed—Hershey Farm Co.
Delaware, ...	1	1	....	1	1 killed.
Lancaster, ...	1	21	20	1	1 killed.
Lawrence, ...	1	110	64	46	33 killed—13 in quarantine.
Luzerne	2	13	4	9	4 killed— 5 in quarantine.
Montgomery, ...	1	5	5	....	
Philadelphia, ...	2	2	2	....	
York, ...	1	26	10	16	16 killed.

NOTE—1 dog and 1 monkey were also tested and passed.

TUBERCULOSIS

January 1, 1916, to December 31, 1916

Counties	No. Herds Tested		No. Herds Tested		Total number herds tested	Total number cattle tested	Number herds examined physically	Number cattle examined physically	Number cattle tested and examined	Number condemned on tuberculin test	Number condemned on physical examination	Total number condemned	Percentage based on number tested and examined.
	S.	O.	S.	O.									
Adams,	....	4	....	38	4	38	1	1	39	7	1	8	20.51+
Allegheny,	1	34	49	424	53	473	3	4	477	191	4	195	40488+
Armstrong,	....	2	....	12	2	12	....	....	12	....	....	....	....
Beaver,	....	7	....	77	7	77	1	1	78	3	1	4	5.12+
Bedford,	....	....	....	....	....	....	....	....	....	....	....	....	....
Berks,	....	11	....	227	11	227	....	....	227	13	....	13	5.72+
Blair,	....	3	....	55	3	55	2	33	88	11	1	12	13.63+
Bradford,	....	64	....	895	64	895	....	....	895	32	....	32	3.57+
Bucks,	2	60	250	726	62	976	3	3	979	106	3	109	11.13+
Butler,	....	16	....	135	16	135	....	....	135	23	....	23	17.03+
Cambria,	....	4	....	39	4	39	....	....	39	....	....	....	....
Carbon,	....	2	....	133	2	133	....	....	133	11	....	11	8.27+
Center,	1	10	63	159	11	222	....	....	222	52	....	52	23.42+
Chester,	3	153	160	2,967	156	3,127	1	1	3,128	365	1	366	11.70+
Clarion,	....	4	....	30	4	30	....	....	30	1	....	1	3.33+
Clinton,	....	3	....	51	3	51	....	....	51	....	....	....	....
Clearfield,	....	1	....	1	1	1	1	1	2	....	....	....	....
Columbia,	....	14	....	73	14	73	....	....	73	1	....	1	1.36+
Crawford,	....	26	....	298	26	298	1	1	299	29	....	29	9.68+
Cumberland,	....	22	....	273	22	273	1	1	274	4	1	5	1.82+
Dauphin,	15	17	445	433	32	878	....	....	878	236	....	236	26.87+
Delaware,	2	52	22	1,075	54	1,097	....	....	1,097	53	....	53	4.83+
Elk,	....	....	....	....	....	....	....	....	....	....	....	....	....
Erie,	1	29	22	306	30	328	....	....	328	34	....	34	10.36+
Fayette,	1	6	10	36	7	46	4	4	50	16	4	20	40.
Forrest,	....	1	....	3	1	3	....	....	3	2	....	2	66.66+
Franklin,	3	33	14	174	36	188	7	59	248	4	5	9	3.64+
Greene,	....	4	....	28	4	28	....	....	28	1	....	1	3.57+
Huntingdon,	1	....	38	....	1	38	....	....	38	....	....	....	....
Indiana,	....	1	....	12	1	12	1	1	13	....	1	1	7.69+
Jefferson,	....	5	....	32	5	32	....	....	32	9	....	9	28.12+

TUBERCULOSIS—Continued

Counties	No. Cattle Tested		No. Cattle Tested		Total number herds tested	Total number cattle tested	Number herds examined physically	Number cattle examined physically	Number cattle tested and examined	Number condemned on tuberculin test	Number condemned on physical examination	Total number condemned	Percentage based on number tested and examined.
	S.	O.	S.	O.									
Juniata,	....	1	....	7	1	7	....	....	7	....	....	....	....
Lackawanna,	....	19	....	495	19	495	1	2	497	29	....	29	5.83+
Lancaster,	1	26	4	272	27	276	6	22	298	40	5	45	15.10+
Lawrence,	2	16	132	434	18	566	....	....	566	145	....	145	25.61+
Lebanon,	....	30	....	672	30	672	4	4	676	....	4	4	.59+
Lehigh,	....	25	....	509	25	509	....	....	509	58	....	58	11.38+
Luzerne,	....	18	....	126	18	126	2	15	141	41	2	43	30.49+
Lycoming,	....	15	....	104	15	104	....	....	104	5	....	5	4.80+
McKean,	....	3	....	176	3	176	....	....	176	5	....	5	2.84+
Mercer,	....	13	....	148	13	148	....	....	148	4	....	4	2.70+
Mifflin,	....	3	....	19	3	19	....	....	19	....	....	....	....
Monroe,	....	2	....	18	2	18	....	....	18	5	....	5	27.77+
Montour,	....	2	....	12	2	12	....	....	12	6	....	6	50. +
Montgomery,	3	145	187	1,835	148	2,022	1	1	2,023	129	1	130	6.42+
Northampton,	1	17	21	87	18	108	....	....	108	5	....	5	4.62+
Northumberland,	....	6	....	53	6	53	....	....	53	4	....	4	7.54+
Perry,	....	1	....	15	1	15	....	....	15	....	....	....	....
Philadelphia,	1	70	1	744	71	745	1	2	747	55	1	56	7.40+
Potter,	....	2	....	26	2	26	....	....	26	....	....	....	....
Schuylkill,	....	4	....	41	4	41	....	....	41	2	....	2	4.87+
Snyder,	....	....	....	....	....	....	....	....	....	....	....	....	....
Somerset,	....	17	....	129	17	129	1	1	130	20	1	21	15.38+
Sullivan,	....	....	....	....	....	....	....	....	....	....	....	....	....
Susquehanna,	....	56	....	1,498	56	1,498	....	....	1,498	53	....	53	3.53+
Tioga,	....	30	....	216	30	216	....	....	216	4	....	4	1.85+
Union,	....	1	....	1	1	1	1	1	2	....	1	1	50. +
Venango,	....	4	....	209	4	209	....	....	209	37	....	37	17.70+
Warren,	1	5	199	53	6	252	....	....	252	13	....	13	5.11+
Washington,	1	15	20	145	16	165	....	....	165	24	....	24	14.54+
Wayne,	....	13	....	264	13	264	....	....	264	....	....	....	....
Westmoreland,	....	12	....	130	12	130	2	2	132	18	1	19	14.30+
Wyoming,	....	6	....	85	6	85	....	....	85	2	....	2	2.35+
York,	2	17	46	163	19	209	3	3	212	47	3	50	23.58+
Totals,	42	1,182	1,683	17,398	1,224	19,081	48	219	19,244	1,955	41	1,996	10.37+

CATTLE IMPORTED INTO PENNSYLVANIA

January 1, 1916, to December 31, 1916

	Examined and tested with tuberculin	Condemned	Held for retest	Passed on retest	Reactors killed.	Autopsy findings		Carcasses inspected	
						Pos.	Neg.	Psd.	Cnd.
Tested before shipment,	13,162	181	.....	......	......	....	....	....	....
Tested at Lancaster,....	6,253	102	265	181	94	78	16	84	10
Tested at Pittsburgh,...	4,719	47	146	111	43	33	10	34	9
Tested at other points in Pennsylvania, ...	793	22	74	65	21	20	1	17	4
Totals, ...	24,927	352	485	357	158	131	27	135	23

RECORD OF TUBERCULIN TESTS ON INTERSTATE CATTLE

Year	Cattle shipped on permit.	Condemned	Cattle shipped on permit without permit	Condemned.	Cattle tested before shipment	Condemned
1898, ...	10,374	37	3,468	19	736	7--not shipped
1899, ...	10,034	32	3,522	38	1,044	
1900, ...	12,356	59	3,652	61	1,827	
1901, ...	13,110	80	4,252	67	1,454	
1902, ...	14,967	74	4,287	91	1,561	3—not shipped
1903, ...	13,069	14	3,736	73	1,469	
1904, ...	14,178	14	4,921	89	1,961	15—not shipped
1905, ...	21,922	69	5,493	108	2,427	27—not shipped
1906, ...	17,366	55	8,212	67	2,734	29—not shipped
1907, ...	17,048	142	835	18	2,221	25—not shipped
1908, ...	12,709	75	4,638	115	910	22—not shipped
1909, ...	14,584	33	8,953	112	1,363	14—not shipped
1910, ...	14,248	109	4,161	61	1,219	9—not shipped
1911, ...	15,392	108	6,277	113	2,213	109—not shipped
1912, ...	14,438	82	3,462	102	2,878	80—not shipped
1913, ...	....	....	27,708	260	11,543	187—not shipped
1914, ...	....	....	22,087	202	10,557	163—not shipped
1915, ...	....	....	9,320	88	10,891	107—not shipped
Total—18, ...	215,795	983	128,984	1,684	59,008	797

ENFORCEMENT OF LAWS

The Board is charged with the enforcement of certain laws which are in the nature of police regulations to protect livestock interests and public health. Frequent violations come under our observations, but in many instances the offender suffers personal losses and is the only person damaged. In such cases we do not feel justified in entering criminal proceedings, as the guilty party is usually brought to a realization that the law was enacted for his protection and it will be to his advantage to comply in the future.

A case of this nature involving the Livestock Law, recently occurred in Chester county. A good citizen purchased two pure bred cows in an adjoining state, they were represented to him as having passed a successful tuberculin test to comply with the Pennsylvania law. The cows were imported into Pennsylvania without the required health certificate and tuberculin test chart, and without previous notification to the Board, contrary to law. After arrival in this State, they were found to be badly affected with tuberculosis and proved a total loss to the purchaser. He now realizes that if he had complied with the full requirements of the Pennsylvania Livestock Law he would have been saved that loss. This is not an isolated case, numerous such instances are on record.

It is seldom that we find a farmer or breeder of livestock who knowingly or intentionally violates the law by importing or selling diseased animals. The man who causes most trouble to the Board and damage to livestock interests, is the unscrupulous or careless dealer who sells animals affected with a dangerous transmissible disease in order to avoid personal losses. Many extensive outbreaks of such diseases have been traced to private and public sales of dealers. An experienced dealer has more opportunity and is better qualified to detect diseases of livestock than is the average farmer or breeder. In addition, the dealers in general are familiar with the law and know that our Board is ready to assist them in establishing a diagnosis when there is suspicion of a dangerous disease.

It is the policy of the Board to avoid prosecution unless there is evidence to show that the defendant knowingly and intentionally committed an offense; or evaded the law with consequent damage to innocent persons.

In some instances, what appears to be a mild infraction of law may prove to have far reaching effects. A butcher in Jefferson county imported a carload of cattle from Buffalo for immediate slaughter, the law does not require inspection and test of this class of cattle except when unusual conditions prevail. Included with the consignment were three bulls which were not immediately slaughtered but placed with a farmer for service and to fatten. This was contrary to section 13, Act of July 22, 1913; * * * "It shall be unlawful for any person to sell for dairy or breeding purposes any domestic animals brought into the State for immediate slaughter, or to use or permit to be used any such animal for dairy or breeding purposes." Three months later the bulls were driven into the slaughter pens. In the interval, Foot and Mouth disease had appeared in the State and the bulls were placed in pens which had unknowingly become infected. While awaiting slaughter they were purchased by a dealer who sold them to farmers for breeding purposes. The Foot and Mouth disease infection was carried to these farms causing losses of the entire herds.

During April and May extensive outbreaks of hog cholera occurred in nine counties causing death of hundreds of hogs. The infection was traced to certain places in the Cumberland Valley where dealers had held public sales. Other dealers purchasing at these sales shipped the hogs to their home counties and resold them to dealers and farmers. Some of the Cumberland Valley hogs passed through the public sales of three or four dealers before final placement on farms. At each sale they came in contact with hogs gathered from other places causing more extensive spread of infection. Investigation showed that some hogs were infected or exposed to infection at each public sale, in fact a few hogs died immediately preceeding, or on day of sale.

As a result of two sales in Northampton county the disease was spread to seventy-two farms in that county and the adjoining county of Lehigh, involving the loss of about four hundred head. In cases of this nature we feel that the dealer is unscrupulous or criminally negligent and a fit subject for prosecution.

Another Act of Assembly which the Board is charged to enforce is known as the Meat Hygiene Act of 1915. The purpose of this law is to prevent the sale of unwholesome meats and to insure the preparation and handling of meats and meat food products in a cleanly manner in slaughter houses, stores and vehicles. Dealers who desire to serve their patrons with wholesome meats slaughtered and handled under sanitary conditions, welcomed this law as giving them protection against unscrupulous competitors and irresponsible slaughterers. It has been a practice far too common, for farmers and small butchers to slaughter and dress food animals which are in a dying condition from disease or serious ailment. In fact cases have arisen in which there were strong suspicion that the animal had died of natural causes and the carcass dressed for food.

It has been the custom in some meat establishments to treat and "work up" tainted meats into sausage and other meat food products. One such case was prosecuted by the Board and the offender heavily fined. It was an aggravated case, agents of the Board found putrid meat cut up for sausage and being prepared for sale in various ways on six different occasions. Beyond the offense to common decency there lies grave danger of serious illness and possible death to consumers of the unwholesome product.

During the short time since the Meat Hygiene Act has been effective (May 28th, 1915) its operation has been very satisfactory. It provides for due notice to the dealer to remove the unlawful condition and this provision obviates almost entirely the necessity for prosecution. In nearly every instance we find the dealer very willing to comply as soon as he is made aware of the defect in his methods or establishment.

An interesting case which received final adjudication by the Dauphin County Court in November was the outgrowth of an alleged offense committed in December, 1914, during the epizootic of Foot and Mouth disease. The opinion written by the Court is of especial interest in connection with the enforcement of stringent quarantine regulations during prevalence of dangerous transmissible diseases and is given place in this report:

COMMONWEALTH } IN THE COURT OF QUARTER SESSIONS OF
vs. } DAUPHIN COUNTY.
.... } No. 40 March Sessions, 1915.

BY THE COURT:

Section 16, of the Act of Assembly of July 22, 1913, P. L. 928, makes it unlawful for any person to remove from the premises quarantined by authority of that Act, inter alia, any "hay, straw, grain, fodder or other food," without a special permit in writing from the State Livestock Sanitary Board. The defendants were indicted for violating this section and the jury returned a special verdict, in which they find that one, * * * , and the defendant, * * * , removed, without a permit, the milk taken from certain cows which were on the quarantined premises; that the other defendant, * * * , the owner of the premises, was present at the time, but that milk was removed without his consent, that * * * and * * * secured the milk and removed it for the purpose of having it analyzed in order to ascertain whether there was present any evidence of foot-and-mouth disease.

The question presented is whether milk is embraced by the term "or other food" as used in the section referred to. It is suggested by the defendant that "other food" is to be interpreted in the light of the words with which it is associated in the section, and that the rule of ejusdem generis should govern. The words used are "hay, straw, grain, fodder or other food." Whether we view "other food" as defined and limited by the use which may be made of the articles of food specifically named, or as restricted to the class to which they belong, the rule of ejusdem generis cannot apply. "Other food" cannot be interpreted to mean food used by animals alone because the word "grain" is one of the articles of food mentioned, and is used as a food by man as well as by beast. Nor can it be restricted to articles of food belonging to the class to which those specifically named belong. If so, nothing would be added to the prohibited list, for grain is a collective word and necessarily includes other articles of food belonging to the same class as those specified. As was said in Weiss vs. Swift & Co., 36 Sup. Ct. 376, "it has been held upon sound reason that when the particular word or words exhaust a whole genus the general term will not be regarded as surplusage but will be construed to refer to a larger class."

Moreover, the rule contended for must be subject, if possible, to the more imperative rule, that such interpretation should be put upon the language of a statute as will effectuate its purpose. The general object of the statute before us was to prevent the spread of transmissible disease among animals and poultry. If the word "food" is given its general and common meaning it would include milk, the product of the animals which were quarantined on the premises in question. The removal of milk from the premises would just as likely spread disease as the removal of any of the other articles of food, especially if the milk be taken from animals under quarantine for a transmissible disease. We think, therefore, to carry out the purpose of the Act, the proper interpretation of the words "or other food" requires us to hold that milk, the food which was removed from the quarantined premises, falls within the statutory prohibition. This article of food comes both within the letter and the purpose of the statute.

The special verdict shows that the milk was removed by one * * * , who was not indicted, and by * * * , one of the defendants, who was at the time in the employ of * * * , the other defendant, but that the latter took no active part in what was done. The facts found by the verdict in nowise implicate him in the offense against the statute. It is true the removal was for an entirely innocent purpose but this can make no difference. The prohibition of the statute is absolute.

In pursuance of the finding of the jury, we direct a verdict of "guilty" on the second count of the indictment to be entered against * * * , the defendant, and a verdict of "not guilty" to be entered as to * * * , the other defendant.

(Signed) GEORGE KUNKEL, P. J.

PROSECUTIONS.

January 1 to December 31, 1916.

County.	Act of	Section.	Result.
Bucks,	July 22, 1913,	8-10	Guilty.
Blair,	May 28, 1915,	9	Guilty.
Chester,	July 22, 1913,	8-10	In Court.
Delaware,	July 22, 1913,	8-10	Nol Pros.
Delaware,	July 22, 1913,	8-10	Nol Pros.
Dauphin,	July 22, 1913,	27	Guilty.
Erie,	July 22, 1913,	16	Nol Pros.
Lancaster,	May 28, 1915,	8	Guilty (6).
McKean,	July 22, 1913,	10	Guilty.
Northampton,	Civil suit,	....	In Court.
Northampton,	July 22, 1913,	27	In Court.
Philadelphia,	July 22, 1913,	16-27	In Court.

In addition to the above, 27 cases of alleged violations were investigated and adjusted without prosecutions.

Respectfully yours,

C. J. MARSHALL,

State Veterinarian and Secretary State Livestock Sanitary Board.

REPORT OF THE BUREAU OF STATISTICS

Harrisburg, Pa., March 20, 1917.

Hon. Charles E. Patton, Secretary of Agriculture:

Dear Sir: I have the honor to submit herewith a report of the Bureau of Statistics, Department of Agriculture, for the year ending December 31, 1916.

CROP AND LIVESTOCK REPORTS

The collection of information monthly relating to the cereal crops, potatoes, tobacco, fruit, livestock, etc., as well as miscellaneous information along agricultural lines, receives special attention in this Bureau and consumes the major portion of our time. We now have nearly eight hundred township correspondents, varying from five to twenty-two in a county. We are pleased to say that these reporters rank among the best farmers in their respective counties.

We are pleased to furnish herewith copies of the detailed monthly crop and livestock reports of the Bureau with our comment pertinent to each. It will be observed that the data relating to the number of sheep killed and injured by dogs, etc., is made a part of the report for the month of April.

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION OF CROPS AND LIVESTOCK, ETC., JANUARY 1, 1916.

The following report is compiled from the returns received from the official correspondents of the Department:

Horses—Estimated number on farms in Pennsylvania, all ages,	596,000
Average value per head,	$121 00
Approximate total value of horses in the State,	$72,116,000 00
Condition compared with an average,	100%
Mules—Estimated number,	46,000
Average value per head,	$128 00
Approximate total value of mules,	$5,888,000 00
Condition compared with an average,	100%
Milch Cows—Estimated number,	952,000
Average value per head,	$55 50
Approximate total value of cows,	$52,836,000 00
Condition compared with an average,	101%
Other Cattle—Estimated number,	644,000
Average price per head,	$29 00
Approximate total value of other cattle,	$18,676,000 00
Condition compared with an average,	101%
Sheep—Estimated number,	806,000
Average price per head,	$5 40
Approximate total value of sheep,	$4,352,400 00
Condition compared with an average,	100%
Hogs—Estimated number,	1,186,000
Average value per head,	$11 80
Approximate total value of hogs,	$13,974,800 00
Condition compared with an average,	100%
Corn—Condition in the crib compared with an average,	94%
Amount to be husked yet,	4%
Amount of crop that will be fed on the farm,	89%
Wheat—Condition of wheat in the ground compared with an average,	97%
Rye—Condition of rye in the ground compared with an average,	97%
Automobiles—Farmers using automobiles for business and pleasure,	9.5%

REVIEW OF CROP AND LIVESTOCK CONDITIONS, JANUARY 1, 1916

During the year 1914 the number of horses in Pennsylvania increased approximately 12,000 and the number of mules 1,000. Our reports at the present time indicate that there has been no increase during the past year. This has been due no doubt to the large number of animals that have been shipped out of this state for service in the European War. The average price of horses and mules has declined during the year 1915 and this again may be due in a measure to the higher priced animals being shipped out of the state.

The number of milch cows and other cattle have increased one per cent. during the past year notwithstanding the fact that more than 15,000 cattle were killed during the close of 1914 and the year 1915, because of the foot-and-mouth disease. Then, the quarantine that prevailed during the prevalence of this disease materially interfered with the breeding. The price of cows appears to be somewhat lower than a year ago but other cattle remain at about the same price.

The estimated number of sheep in this state ten years ago was 1,102,000. The present number appears to be 806,000. The decrease during the past year was three per cent. This seems to be the average yearly decrease during the past ten years. This marked decline in what was once a very important industry in Pennsylvania may be partially due to other causes, but our correspondents throughout the state inform us that it is due to the great damage done by the dogs. Farmers are discouraged and are quitting the business.

The number of hogs remains about the same as a year ago, The number would have been about one per cent.larger had it not become necessary to slaughter over 13,000 on account of the foot and mouth disease. The average price of hogs is somewhat lower than a year ago.

The approximate total value of the horses, mules, milch cows, other cattle, sheep and hogs in the state is $167,843,000.00.

This report shows that the condition of livestock generally stands at about 100 per cent. at the present time. A month ago our correspondents informed us that on account of the good pasture during the fall, the livestock had gone into winter quarters in good condition. Owing to this and the favorable weather that has prevailed since winter set in, we have reason to believe that the present condition of livestock is considerably above an average.

Because of the wet weather during the late summer and early fall the corn did not mature well. This accounts for much soft corn going into the cribs. The condition of the corn at the present time is 94 per cent. compared with 101 per cent. a year ago.

Our estimate a year ago showed that about 15,000 farmers were using automobiles for business and pleasure. The number has increased to over 22,000 at the present time.

The following information is furnished by the Section Director, U. S. Department of Agriculture, Local Office of the Weather Bureau, Philadelphia, Pa.:

"WEATHER SUMMARY FOR PENNSYLVANIA, DECEMBER, 1915

The month as a whole was moderately cold, but with no unusual extremes, and with comparatively few sudden or rapid changes in temperature. The mean temperature, as recorded at 74 stations, was

29.4 degrees, or 1.5 degrees below the December normal. The highest was 70 degrees at Lebanon on the 25th, and the lowest was 7 degrees at Honesdale on the 31st. There were only 6 stations that recorded temperatures as low as zero. The precipitation was moderately heavy, averaging 4.06 inches, or 0.82 inch above the December normal. There was a very large amount of cloudiness, about one fifth of the stations reporting 25 or more cloudy days, while Baldwin reported 31. At Erie the sunshine was only about 2% of the possible amount. The snowfall averaged 13.7 inches, which is more than ordinarily occurs in December. The greatest local snowfall was 33.3 inches at Somerset, while in the three northwestern counties it averaged nearly 30 inches. Much of the precipitation occurred during the daylight hours and with the large amount of cloudiness gave the impression of being an exceedingly wet and snowy month. The cloudy and damp conditions apparently favored the spread of a grip and pneumonia epidemic, which reached all parts of the State in a virulent form and nearly doubled the death rate in some places. The only severe storm occurred on the 29th, when considerable damage resulted to wire service of all kinds."

L. H. WIBLE,
Statistician.

CROP AND LIVESTOCK REPORT

Report of the Pennsylvania Department of Agriculture on the Condition of Crops and Livestock, January 1, 1916

Counties	Livestock											
	Number reports filed	Horses—Number compared with one year ago	Horses—Average price per head	Horses — Condition compared with an average	Mules—Number compared with one year ago	Mules—Average price per head	Mules—Condition compared with an average	Milch Cows—Number compared with one year ago	Milch Cows—Average price per head	Milch Cows—Condition compared with an average	Other Cattle—Number compared with one year ago	Other Cattle—Average price per head
		%		%	%		%	%		%	%	
Adams,	8	97	$95 00	98	100	$105 00	97	97	$51 50	97	95	$32 75
Allegheny,	17	98	140 00	100	96	136 00	100	101	68 00	102	98	29 50
Armstrong,	8	100	114 00	100	97	125 00	100	104	61 60	100	100	30 00
Beaver,	10	99	116 00	100	98	120 00	99	101	61 00	102	100	28 00
Bedford,	13	99	115 00	101	97	131 00	102	101	47 50	103	106	25 70
Berks,	20	100	115 00	100	100	124 00	99	102	65 60	103	103	31 25
Blair,	9	100	124 00	100	101	125 00	99	101	58 90	100	101	28 90
Bradford,	11	101	132 00	100	110	132 00	100	102	56 50	101	102	28 60
Bucks,	13	100	127 00	98	101	101 00	99	98	72 00	101	100	31 50
Butler,	17	102	130 00	102	100	137 00	103	103	58 30	102	101	30 50
Cambria,	8	101	129 00	100	100	125 00	98	100	52 00	100	103	28 00
Cameron,	4	100	127 00	100	....	....	....	99	45 00	100	98	26 50
Carbon,	5	99	140 00	102	103	145 00	100	100	51 00	103	100	28 00
Centre,	11	101	127 00	103	104	136 00	102	102	51 50	101	102	26 70
Chester,	23	99	110 00	101	101	118 00	101	95	66 00	101	102	32 90
Clarion,	9	100	123 00	100	102	135 00	100	100	46 00	100	102	26 25
Clearfield,	10	99	120 00	99	97	130 00	98	100	49 50	100	97	26 00
Clinton,	7	98	128 00	100	100	132 00	100	100	51 25	100	100	30 00
Columbia,	11	100	125 00	100	100	120 00	100	101	49 00	102	99	27 25
Crawford,	13	103	110 00	99	100	115 00	98	102	47 50	98	101	26 00
Cumberland,	13	99	110 00	99	100	120 00	101	101	59 00	100	99	31 25
Dauphin,	12	102	110 00	99	103	125 00	99	102	56 75	100	102	29 25
Delaware,	7	100	115 00	101	99	150 00	100	98	67 70	101	102	30 70
Elk,	4	100	132 00	98	100	140 00	100	103	55 00	99	102	29 00
Erie,	8	99	116 00	98	100	128 00	100	101	50 00	101	103	26 80

Fayette,	12	100	110 00	101	101	122 00	100	101	52 00	103	99	31 75
Forest,	6	100	128 00	98	100	125 00	98	100	39 20	98	101	27 20
Franklin,	8	101	100 00	100	101	108 00	100	100	52 60	100	100	23 25
Fulton,	9	101	95 00	98	100	112 00	100	98	40 50	100	98	24 00
Greene,	9	98	92 00	100	102	100 00	98	104	49 50	100	106	28 50
Huntingdon,	15	101	112 00	98	99	120 00	100	100	51 00	101	99	26 00
Indiana,	12	98	125 00	100	97	122 00	100	101	54 00	103	101	28 50
Jefferson,	10	97	118 00	98	98	130 00	98	103	49 00	101	95	25 25
Juniata,	6	96	105 00	96	94	117 00	97	97	67 00	96	100	27 00
Lackawanna,	8	100	124 00	100	98	118 00	102	100	58 00	101	102	28 80
Lancaster,	22	99	134 00	100	99	145 00	101	101	66 75	101	99	35 00
Lawrence,	9	101	108 00	101	100	120 00	100	100	57 00	100	102	29 00
Lebanon,	7	99	110 00	97	99	116 00	98	100	68 40	101	98	31 70
Lehigh,	12	101	128 00	100	100	150 00	100	99	62 50	102	105	32 50
Luzerne,	7	99	124 00	98	102	137 00	100	100	49 60	100	100	25 00
Lycoming,	17	101	140 00	101	100	140 00	100	102	46 00	99	102	26 40
McKean,	7	102	135 00	101	....	....	....	103	51 70	102	99	27 00
Mercer,	16	103	118 00	100	100	120 00	99	105	57 50	100	102	31 00
Mifflin,	7	102	107 00	99	103	116 00	100	100	49 00	99	105	27 50
Monroe,	11	101	112 00	100	100	125 00	99	102	49 00	100	103	28 30
Montgomery,	12	98	127 00	98	101	136 00	99	100	72 00	98	102	30 80
Montour,	5	100	129 00	102	99	142 00	100	106	63 00	105	97	30 60
Northampton,	8	100	142 00	101	100	152 00	100	101	66 80	102	99	36 00
Northumberland,	9	100	122 00	101	101	127 00	100	100	50 00	98	103	26 00
Perry,	10	100	118 00	97	100	128 00	99	99	48 20	98	97	23 00
Philadelphia,	5	97	138 00	100	99	154 00	99	100	72 00	102	100	36 50
Pike,	5	98	121 00	99	99	126 00	100	102	53 00	100	102	27 50
Potter,	9	103	118 00	98	106	132 00	100	102	49 00	100	104	29 25
Schuylkill,	7	101	141 00	100	100	142 00	100	104	64 00	100	99	29 00
Snyder,	6	100	123 00	100	99	131 00	100	102	46 20	102	106	23 00
Somerset,	12	101	108 00	99	103	115 00	100	101	55 00	101	104	32 50
Sullivan,	7	99	140 00	100	102	125 00	98	102	45 80	102	102	30 00
Susquehanna,	11	99	129 00	100	105	130 00	100	104	62 00	100	104	30 80
Tioga,	8	101	127 00	101	102	135 00	99	99	53 25	100	98	28 60
Union,	8	100	113 00	100	100	110 00	100	104	58 00	100	101	34 00
Venango,	12	98	122 00	98	....	....	....	101	51 00	99	98	25 50
Warren,	8	102	135 00	100	....	....	....	99	48 75	100	98	29 40
Washington,	17	101	114 00	101	99	118 00	101	100	64 25	102	101	34 40
Wayne,	11	101	132 00	99	....	....	....	102	50 00	100	100	25 50
Westmoreland,	9	100	129 00	100	101	142 00	98	102	62 00	100	102	30 40
Wyoming,	6	101	118 00	98	98	125 00	98	104	54 50	99	101	27 50
York,	13	101	108 00	99	98	119 00	100	102	58 60	100	100	29 00
Total,	100	679	$121 00	100	100	$128 00	100	101	$55 50	101	101	$29 00

CROP AND LIVESTOCK—Continued

Counties	Livestock							Corn			Winter grain		
	Other Cattle—Condition compared with an average	Sheep—Number compared with one year ago	Sheep—Average price per head	Sheep—Condition campared with an average	Hogs—Number compared with one year ago	Hogs—Average price per head	Hogs—Condition compared with an average	Corn—Condition in crib compared with an average	Corn—Amounts yet to be husked	Corn—Amount of crop that will be fed on the farm	Wheat—Condition of wheat in the ground compared with an average	Rye—Condition of rye in the ground compared with an average	Automobiles—Farmers using automobiles for business and pleasure
	%	%		%	%		%	%	%	%	%	%	%
Adams,	98	94	$4 85	99	98	$10 25	96	94	....	80	94	92	10
Allegheny,	101	98	4 90	100	100	13 80	103	102	10	94	100	99	15
Armstrong,	105	103	5 70	100	104	11 50	100	95	9	95	102	100	8
Beaver,	103	97	4 60	100	101	12 25	103	90	12	94	90	92	6
Bedford,	103	95	5 35	101	98	11 90	99	102	4	92	101	100	10
Berks,	102	98	7 50	100	103	13 90	100	94	....	75	98	100	10
Blair,	99	97	4 70	99	104	12 00	100	93	4	90	97	96	8
Bradford,	102	98	5 90	101	99	11 90	100	100	12	92	100	98	11
Bucks,	99	97	5 80	100	103	12 00	100	98	2	86	99	98	16
Butler,	103	97	5 50	101	103	11 50	102	97	9	95	94	95	10
Cambria,	101	98	4 65	100	102	10 70	99	90	7	90	96	96	6
Cameron,	98	100	5 20	100	98	14 30	98	95	15	98	97	100	....
Carbon,	100	....	....	....	104	11 80	102	102	2	78	99	90	9
Centre,	102	94	5 00	102	104	12 25	102	102	....	86	101	101	8
Chester,	102	98	5 40	100	105	10 60	100	85	3	95	98	98	18
Clarion,	101	95	4 75	100	104	10 85	100	90	7	93	100	99	8
Clearfield,	100	97	5 25	98	102	13 80	100	90	4	98	100	98	6
Clinton,	102	98	5 90	99	105	12 75	100	94	5	85	98	98	10
Columbia,	100	100	4 50	100	101	11 85	99	96	6	85	90	93	8
Crawford,	100	98	5 60	100	97	9 65	99	94	4	96	93	95	8
Cumberland,	103	97	5 85	100	101	9 70	101	100	....	70	96	98	12
Dauphin,	102	96	6 00	98	100	11 60	100	98	....	83	90	90	10
Delaware,	101	100	7 20	100	102	12 25	101	90	3	92	94	93	17
Elk,	100	95	5 75	100	102	11 75	100	97	8	100	98	100	18
Erie,	100	98	5 40	100	96	11 60	99	85	9	99	101	100	15
Fayette,	[illegible]	95	5 20	101	100	11 20	103	98	8	87	103	101	7

Forest,	98	95	4 50	98	101	12 30	95	88	3	93	97	95	3
Franklin,	100	98	5 40	100	102	9 00	100	98	....	85	95	95	7
Fulton,	101	93	5 30	98	95	9 40	100	97	5	87	93	92	6
Greene,	101	93	3 80	98	103	9 00	101	92	12	88	104	106	8
Huntingdon,	101	97	5 70	100	104	10 90	102	99	3	90	98	95	6
Indiana,	102	95	5 40	99	102	9 30	100	94	9	92	102	100	6
Jefferson,	100	97	5 00	100	97	11 10	100	90	9	90	95	95	6
Juniata,	97	90	5 25	96	96	9 80	95	98	3	85	88	90	6
Lackawanna,	102	100	5 75	101	100	10 90	102	95	6	100	100	100	9
Lancaster,	101	100	6 00	100	104	12 40	99	92	....	94	98	97	17
Lawrence,	102	96	4 70	101	101	12 25	101	97	6	93	97	98	9
Lebanon,	100	96	6 25	100	101	11 80	95	94	....	90	95	94	13
Lehigh,	100	....	....	....	99	12 75	99	99	....	82	100	99	13
Luzerne,	100	95	5 60	101	100	12 60	100	90	5	96	99	98	12
Lycoming,	100	98	4 90	100	103	11 75	100	92	....	88	96	96	4
McKean,	102	94	5 20	102	96	13 00	100	92	....	98	100	93	6
Mercer,	99	98	5 20	101	100	11 25	99	95	5	97	98	97	10
Mifflin,	100	95	5 70	100	101	9 70	98	97	3	82	97	94	6
Monroe,	100	94	5 50	104	106	12 60	99	90	....	84	102	104	10
Montgomery,	100	94	5 80	98	96	12 90	99	97	6	93	95	96	14
Montour,	100	94	6 30	100	95	11 90	92	92	2	70	86	88	7
Northampton,	100	97	5 90	103	101	12 20	101	100	....	70	103	100	15
Northumberland,	100	95	6 50	100	98	13 50	99	97	5	75	88	92	9
Perry,	97	94	5 25	97	98	10 80	100	98	2	85	90	90	9
Philadelphia,	104	101	5 00	100	103	14 70	102	96	5	90	95	96	15
Pike,	100	....	....	....	102	13 00	100	94	....	100	100	100	10
Potter,	100	100	5 20	98	97	9 50	99	97	....	98	100	98	7
Schuylkill,	99	98	6 40	97	99	15 00	98	96	....	90	98	97	15
Snyder,	102	96	5 10	100	105	13 25	102	105	....	70	98	97	5
Somerset,	101	97	5 10	100	100	13 80	100	93	3	95	101	98	16
Sullivan,	102	92	5 50	101	106	11 40	98	95	2	98	99	95	10
Susquehanna,	99	94	6 20	100	95	12 20	97	76	....	100	101	101	10
Tioga,	100	94	5 50	100	99	11 10	100	84	....	99	92	92	12
Union,	100	96	5 80	99	100	11 70	101	100	....	65	96	96	7
Venango,	99	98	4 70	101	95	10 75	98	78	6	95	95	94	6
Warren,	100	102	5 20	100	99	12 20	100	87	5	99	95	97	3
Washington,	101	98	4 15	102	100	10 50	101	96	9	90	101	100	12
Wayne,	100	97	6 10	99	100	12 90	100	90	....	100	....	99	10
Westmoreland,	102	97	5 70	100	101	12 70	99	95	13	90	102	102	9
Wyoming,	101	96	5 25	105	100	11 40	96	90	4	98	104	104	6
York,	99	93	6 00	99	105	12 50	99	95	....	85	96	100	10
Total,	101	97	$5 40	100	100	$11 80	100	94	4	89	97	97	9.5

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION OF CROPS, LIVESTOCK, ETC., MARCH 1, 1916.

The following report is compiled from the returns received from the official corrspondents of the Department:

Estimated number Pure Bred Livestock:	
Stallions,	1,500
Bulls,	8,890
Boars,	7,400
Rams,	3,490
Steers—Farmers fattening steers for spring market,	5%
Commercial Fertilizer—Farmers using,	78%
Average amount used by each farmer,	2 tons.
Average amount used per acre,	235 pounds.
Total number of tons used,	338,520
Average price paid per ton,	$21 62
Total amount paid,	$7,318,800
Lime—Number of farmers using lime for agricultural purposes,	48%
Wheat—Condition at present compared with an average,	94%
Crop of 1915 still in producers' hands,	25%
Rye—Condition at present compared with an average,	94%
Farmers hiring female household help,	11%

REVIEW OF CROP AND LIVESTOCK CONDITIONS, MARCH 1, 1916.

Reports from 675 townships show 642 stallions, 3,872 bulls, 3,225 boars and 1,520 rams. Assuming that there are the same number pro rata in the other eight hundred and seventy-seven townships, then, the approximate number of pure bred animals in the state is as follows: 1,500 stallions, 8,890 bulls, 7,400 boars and 3,490 rams. Westmoreland county appears to rank first in the number of pure bred stallions, Tioga and Washington in the number of bulls, Washington and Westmoreland in the number of boars and Washington in the number of rams.

It appears that only five per cent. of the farmers are feeding steers for spring market. This is a smaller number than are usually fed. This may be attributed to fear of another epidemic of foot and mouth disease, high price of feeders last fall, high price of hay and grain; but the principal reason we gather from our correspondents is that there is more profit in keeping dairy cows, consequently more attention is given to this from year to year and less to fattening steers. It is observed that in the northern tier counties, which are noted for their dairy products, practically no steers are fed. Lancaster county as usual ranks first in this industry.

Our estimates show that seventy-eight per cent. of the farmers of this state are using commercial fertilizer. This is ten per cent. less than reported one year ago. This marked decrease is largely due to the high prices that prevail, because of the lack of potash and the increase in price of other fertilizer material. It is estimated that the amount spent by the farmers for commercial fertilizer during the past year is $7,318,800.

Approximately one-half of the farmers of the state are using lime for agricultural purposes. Word comes from every part of the State that the tendency is among farmers to use more lime.

The condition of the wheat and rye is fixed at 94 per cent. compared with an average. It appears that the condition of these cereals is about the same as it was at this time last year. The southwestern counties show the best condition. It seems that about 6,232,000 bushels, which is about one-fourth of the 1915 crop of wheat, is still in the farmers' hands.

Reports show that about 23,870 farmers hire female household help. Assuming that each farmer employs but one domestic, the sum that these women receive per week is $76,380.00; and the total amount per year is $3,972,000.00. This computation is made on the basis of $3.20 per week.

The following information is furnished by Mr. George S. Bliss, Section Director, U. S. Department of Agriculture, Local Office of the Weather Bureau, Philadelphia, Pa.:

"WEATHER SUMMARY FOR PENNSYLVANIA, FEBRUARY, 1, 1916

The month as a whole was moderately cold, and the temperature changes were frequent and sometimes rapid. The monthly temperature range was slightly more than is usual, but neither of the extremes were unprecedented. There was much cloudiness, the sunshine averaging only about one-third of the possible amount, and the effect of the weather conditions as a whole was disagreeable. The precipitation averaged nearly normal, there being considerable excess in the southwestern counties, while a moderate deficiency was reported from most stations in the remainder of the State. The streams were at moderate stages most of the time, there being no high water or flood conditions except in the upper Monongahela about the middle of the month, when a stage of 23.0 feet was recorded at Greensboro. That was 5.0 feet above the established flood stage. The relative amounts of rain and snow were about normal. The heaviest snowfall was 33.8 inches at Somerset, while amounts in excess of 20.0 inches were reported from several stations in the northwest, and from a few scattered localities in other parts of the State. The cold wave on the 14th and 15th was the most severe that occurred during the winter, although it was of short duration."

CROP AND LIVESTOCK REPORT,

Report of the Pennsylvania Department of Agriculture on the Condition of Crops and Livestock, Etc., March 1, 1916

Counties	Number reports filed	Pure Bred Livestock				Steers	Commercial Fertilizer				Lime	Wheat		Rye	Household help
		Number pure bred stallions	Number pure bred bulls	Number pure bred boars	Number pure bred rams	Number of farmers fattening for spring market	Number of farmers using	Average number of tons used by each farmer	Average amount used per acre	Average price paid per ton	Number of farmers using for agricultural purposes	Condition in ground compared with an average	Crop of 1915 still in producers' hands	Condition in ground compared with an average	Farmers hiring female household help
						%	%		lbs.		%	%	%	%	%
Adams,	9	3	32	54	28	14	93	2.5	200	$17 60	40	92	32	85	18
Allegheny,	16	6	47	45	10	2	75	2.5	240	23 40	55	97	30	96	13
Armstrong,	7	11	23	33	21	9	81	1.75	180	19 20	72	95	40	95	8
Beaver,	10	8	29	25	25	2	75	2.25	250	20 00	70	88	30	88	4
Bedford,	13	13	73	108	72	6	80	1.75	190	18 00	64	96	35	94	10
Berks,	20	10	44	50	....	5	86	2.25	260	19 50	45	94	18	97	24
Blair,	7	7	24	26	3	2	75	1.6	215	20 80	46	90	34	90	8
Bradford,	11	7	153	42	32	2	70	1.75	250	22 30	43	92	15	93	5
Bucks,	12	9	77	77	5	8	88	2.75	275	24 80	25	93	16	95	18
Butler,	17	20	71	74	44	6	84	1.75	180	21 20	58	90	35	92	7
Cambria,	9	5	50	87	14	8	82	1.75	275	23 10	70	96	45	95	8
Cameron,	4	2	10	20	6	5	70	2.0	275	26 00	20	90	25	92	8
Carbon,	4	2	15	12	....	....	98	2.5	300	24 65	54	98	25	98	25
Centre,	11	5	50	49	14	11	70	1.8	200	22 40	37	95	27	98	22
Chester,	21	24	184	101	21	2	94	3.25	320	22 00	30	98	9	98	14
Clarion,	9	20	37	48	8	13	75	1.5	180	18 00	60	97	25	96	6
Clearfield,	9	8	31	61	23	2	80	1.5	250	23 80	52	90	25	93	7
Clinton,	5	4	12	8	3	....	86	1.6	170	24 20	66	95	24	100	12
Columbia,	9	6	40	58	15	6	97	2.2	200	19 60	62	88	24	88	8
Crawford,	14	28	113	56	82	3	85	1.25	200	22 50	50	90	35	92	5
Cumberland,	11	10	58	99	35	8	88	2.5	185	19 50	38	90	24	94	15
Dauphin,	12	7	48	25	2	9	85	2.0	200	19 75	40	90	20	92	12
Delaware,	9	8	49	34	6	....	92	3.0	400	24 90	44	95	14	94	17
Elk,	4	5	25	23	1	....	88	2.0	260	28 20	60	90	25	90	4
Erie,	9	18	139	47	21	2	92	1.6	180	23 20	30	94	30	90	8

Fayette,	11	9	43	54	5	2	55	1.35	210	22 20	40	104	27	102	4
Forest,	7	4	13	11	7	....	75	2.4	330	23 00	70	94	18	90	4
Franklin,	8	9	56	42	13	8	95	2.75	190	16 50	45	92	32	90	20
Fulton,	8	9	18	20	10	5	92	2.2	170	15 25	40	90	35	92	6
Greene,	8	9	42	45	144	....	50	1.4	165	21 40	7	98	34	101	10
Huntingdon,	14	15	55	46	27	8	85	1.6	190	17 20	26	94	30	96	10
Indiana,	12	20	58	61	23	4	80	2.0	190	20 20	53	96	25	94	7
Jefferson,	11	18	37	62	6	5	60	1.5	200	17 25	53	89	23	90	6
Juniata,	7	2	32	22	15	4	70	1.8	180	18 70	24	80	35	81	12
Lackawanna,	6	....	12	3	1	....	56	1.6	320	26 50	55	....	....	95	5
Lancaster,	21	12	94	116	9	48	85	2.6	265	21 75	48	98	12	97	23
Lawrence,	9	16	89	50	64	2	63	1.7	200	22 35	56	94	30	94	6
Lebanon,	7	....	25	28	....	20	74	2.4	215	21 60	30	90	18	92	25
Lehigh,	11	4	60	45	....	10	99	2.7	260	21 70	35	93	20	95	13
Luzerne,	9	1	23	15	1	....	65	2.3	350	22 40	57	95	11	96	5
Lycoming,	15	6	49	30	3	4	80	1.7	195	21 90	60	87	27	86	11
McKean,	6	4	41	19	11	....	75	1.6	250	24 80	65	93	....	95	9
Mercer,	14	38	148	103	136	6	70	1.8	210	21 60	65	90	30	90	6
Mifflin,	9	10	45	65	27	9	77	2.2	180	17 75	38	94	32	92	15
Monroe,	11	2	34	42	11	2	66	2.0	270	20 60	35	96	10	97	4
Montgomery,	13	14	31	42	5	8	74	1.5	270	24 00	35	94	9	97	13
Montour,	5	2	15	38	....	....	91	2.5	180	19 10	44	85	20	90	10
Northampton,	9	7	28	22	3	9	96	3.5	230	20 00	15	100	20	100	17
Northumberland,	8	7	43	36	1	3	92	2.5	185	19 30	42	86	28	90	10
Perry,	10	2	26	33	11	8	84	1.6	200	17 90	52	90	35	90	15
Philadelphia,	6	8	33	20	10	....	94	4.0	425	28 30	35	93	11	93	30
Pike,	5	....	7	12	....	....	70	1.4	275	28 00	75	93	22	94	6
Potter,	10	3	116	24	18	....	48	1.8	240	24 00	40	97	....	98	4
Schuylkill,	11	3	30	32	2	....	88	2.0	360	22 60	54	92	24	91	13
Snyder,	7	3	41	45	6	5	86	1.8	190	18 70	50	90	35	92	8
Somerset,	11	20	53	55	31	10	80	1.8	180	19 50	50	100	28	97	10
Sullivan,	8	5	28	49	19	4	75	1.35	195	21 25	70	96	20	92	12
Susquehanna,	9	7	92	28	10	....	63	1.25	275	25 40	70	100	24	98	10
Tioga,	10	15	192	67	39	....	50	1.4	210	22 75	30	93	12	93	8
Union,	9	7	68	57	14	2	78	2.0	185	19 80	65	90	32	90	16
Venango,	12	13	34	33	13	3	72	1.5	175	21 45	60	90	22	88	4
Warren,	9	7	40	16	8	....	68	1.4	220	23 25	48	94	20	92	3
Washington,	16	26	192	137	243	6	65	1.7	200	23 65	40	100	30	98	10
Wayne,	13	5	125	33	17	....	70	1.0	400	25 50	46	....	....	97	4
Westmoreland,	8	44	119	170	43	2	50	1.7	280	23 60	60	100	30	102	9
Wyoming,	6	4	43	15	13	....	50	2.0	330	22 20	22	96	....	90	5
York,	14	6	106	115	13	12	97	2.5	230	17 90	48	95	25	96	18
Total,	675	642	3,872	3,225	1,520	5	78	2	235	$21 62	48	94	25	94	11

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION OF CROPS, LIVESTOCK, ETC., APRIL 1, 1916.

The following report is compiled from the returns received from the official correspondents of the Department:

Wheat—Condition compared with an average,	95%
Average number of weeks or snow protection,	7
Rye—Condition compared with an average,	95%
Corn—Condition in the crib compared with an average,	92%
Portion of ground plowed last fall for this year's crop,	20%
Fruit—Prospect compared with a normal yield:	
Apple,	88%
Peach,	63%
Cherry,	85%
Grain—Price per bushel:	
Wheat,	$1 12
Corn,	82
Oats,	52
Rye,	89
Potatoes—Price per bushel,	1 16
Hay—Price per ton,	17 50
Eggs—Price per dozen,	23
Butter—Price per pound,	33
Livestock—Condition compared with an average,	100%

INFORMATION RELATING TO SHEEP KILLED AND INJURED BY DOGS DURING THE YEAR 1915.

Number of sheep killed,	5,808
Number of sheep injured,	4,764
Average price paid for sheep killed,	$6 60
Average price paid for sheep injured,	2 87
Amount paid for sheep killed and injured, including costs,	$53,969 44
Number of dogs assessed,	263,511
Average amount of tax levied for each male dog,	$0 73
Average amount of tax levied for each female dog,	1 48
Amount of dog tax collected for the year,	$135,278 70
Number of dogs killed by direction of the County Commissioners and Tax Collectors,	3,384
Amount expended for the killing of dogs by Constables and Borough Policemen,	$3,342 52
Amount expended for the payment of horses, mules, cattle and swine bitten by mad dogs,	$4,502 41
Amount expended for dog tags,	$3,194 76

REVIEW OF CROP AND LIVESTOCK CONDITIONS, APRIL 1, 1916.

The condition of wheat compared with an average is ninety-five per cent. which is a slight improvement over one month ago and seven points better than the condition at this time last year. This is encouraging information and will cause the farmers to take an optimistic view of the situation, considering the splendid crop last year. There was on an average of seven weeks of snow protection. This varied from four weeks in the southern tier counties to ten weeks in the northern tier counties.

The condition of rye is ninety-five per cent. compared with an average.

The condition of corn in the crib stands at ninety-two per cent. compared with an average. The corn generally was not well matured when it was cribbed last fall and this accounts for it being below an average condition at this time. It appears that twenty per cent. of the corn ground was plowed last fall. The spring weather opens late and plowing starts two weeks later than last year. Spring plowing has started in twenty-three counties while at this time last year plowing had started in fifty-one counties. Greene was the first county to start plowing and this was followed by Fayette, Westmoreland and Somerset.

It is rather early to forecast the fruit, but reports indicate that there will be approximately three-fifths of a normal crop of peaches; and about four-fifths of a normal crop of apples and cherries.

The average price of wheat one year ago was $1.41; corn, 83 cents; oats, 62 cents and rye, 98 cents. Hay, $14.50.

Livestock is fully up to the average condition at this season of the year. Because of the good pasture and favorable weather last fall, the livestock went into winter quarters in good condition and this more than anything else accounts for their good condition now.

For detailed information relating to the sheep killed and injured by dogs during the year 1915, see page 188 of this report.

The following information is furnished by Mr. George S. Bliss, Section Director, U. S. Department of Agriculture, Local Office of the Weather Bureau, Philadelphia, Pa.

SUMMARY OF WEATHER CONDITIONS IN PENNSYLVANIA DURING THE MONTH OF MARCH, 1916

"The month was unusually cold, stormy, and disagreeable. The temperatures were almost constantly below the normal until the last four or five days, and a comparison with previous records shows that it was the coldest March during the last 28 years except that of 1896, which was practically the same.

The snowfall was abnormally heavy except in a few localities along the southern border. It drifted badly in most sections, the wind sweeping it from the smooth surfaces of the open fields so that it did not afford the needed protection for winter wheat. On the 27th, 28th, and 29th it melted rapidly owing to moderately heavy rains and rising temperatures. The streams of the Ohio and Susquehanna drainage areas were raised to or above the flood stages, but in the Delaware basin the rains appeared to be held by the snow at first without much seepage. In consequence the Delaware rose slowly to about two-thirds of a flood stage and then subsided slowly. The ice was out of most of the streams at the end of the month, and the snow had disappeared except in deep ravines and other sheltered places in the mountain districts."

CROP AND LIVESTOCK REPORT

Report of the Pennsylvania Department of Agriculture on the Condition of Crops, Livestock, Etc., April 1, 1916

Counties	Number reports filed	Winter Grains			Corn		Fruit			Grain and Potatoes					Hay	Produce		Live-stock
		Wheat—Condition of wheat in the ground compared with an average at this season of the year	Wheat—Number of weeks of snow protection	Rye—Condition of rye in the ground compared with an average at this season of the year	Condition in crib compared with average years	Portion of ground plowed last fall for this year's crop	Apples—Prospect compared with a normal yield	Peaches—Prospect compared with a normal yield	Cherries—Prospect compared with a normal yield	Wheat—Price per bushel	Corn—Price per bushel	Oats—Price per bushel	Rye—Price per bushel	Potatoes—Price per bushel,	Price per ton	Eggs—Price per dozen	Butter—Price per pound	Condition of livestock compared with an average at this season of the year
		%		%	%	%	%	%	%									%
Adams,	9	92	3	92	94	35	90	52	85	$1 08	$0 75	$0 46	$0 75	$1 04	$17 40	$0 19	$0 27	100
Allegheny,	17	97	6	97	94	12	84	50	87	1 17	87	55	99	1 36	19 25	28	38	105
Armstrong,	9	98	8	97	94	5	86	50	76	1 05	84	54	85	1 12	16 50	23	31	100
Beaver,	8	95	5	95	94	......	90	36	78	1 12	87	54	93	1 40	18 10	28	35	100
Bedford,	11	95	4	97	97	11	93	65	95	1 13	82	50	93	1 09	16 75	20	29	102
Berks,	19	95	5	99	96	30	90	80	90	1 13	79	50	90	1 16	18 75	20	35	102
Blair,	9	93	7	93	94	15	90	75	100	1 09	83	49	88	1 25	18 90	25	33	100
Bradford,	11	98	8	99	85	30	85	40	76	1 18	84	55	90	1 22	14 60	20	32	96
Bucks,	14	94	5	96	96	5	86	80	90	1 17	83	54	90	1 17	18 50	24	40	105
Butler,	17	92	8	95	94	13	94	48	75	1 04	83	54	88	1 14	15 25	21	31	102
Cambria,	10	97	10	96	90	40	90	60	82	1 14	88	54	91	1 20	22 00	27	37	98
Cameron,	4	95	9	95	80	50	95	85	85	1 20	90	56	99	1 40	23 00	27	35	99
Carbon,	4	100	10	98	100	16	92	58	98	1 15	95	60	98	1 37	21 25	25	33	101
Centre,	10	96	7	96	90	42	88	50	76	1 06	78	46	80	1 00	17 00	20	30	100
Chester,	20	94	4	95	90	8	87	66	90	1 12	86	50	96	1 16	18 20	23	39	97
Clarion,	11	100	7	100	90	15	88	46	75	1 12	85	52	86	1 00	16 25	22	30	102
Clearfield,	11	100	9	100	85	20	92	75	86	1 14	92	60	89	1 09	21 75	26	34	94
Clinton,	7	98	8	98	93	33	98	80	98	1 14	88	54	85	1 04	20 40	23	32	99
Columbia,	10	94	8	96	82	12	87	40	80	1 06	82	48	83	1 09	17 10	23	30	100
Crawford,	13	95	8	98	93	15	97	85	93	1 12	78	53	95	98	14 00	22	30	96
Cumberland,	14	95	4	96	97	13	90	67	90	1 05	71	43	78	1 25	18 50	19	32	100
Dauphin,	12	90	5	92	94	15	75	75	84	1 09	70	49	80	1 10	18 00	20	32	100
Delaware,	7	92	8	93	92	13	85	65	80	1 17	92	57	98	1 42	21 70	28	41	100
Elk,	3	95	10	95	93	15	......	......	......	1 25	87	60	1 00	1 10	20 00	26	33	100

Erie,	10	98	10	98	88	12	97	80	90	1 16	80	53	94	1 04	14 65	23	34	98
Fayette,	12	103	6	102	96	10	88	45	86	1 11	83	53	92	1 24	18 25	26	36	105
Forest,	6	98	8	95	94	.....	.....	.....	.....	1 15	85	56	98	1 08	17 10	23	30	102
Franklin,	10	92	3	93	98	12	90	48	84	1 10	74	50	81	1 15	16 15	18	28	100
Fulton,	8	90	4	92	98	30	92	60	90	1 05	74	52	83	1 00	15 25	18	25	98
Greene,	9	102	5	100	90	12	97	60	100	1 10	80	52	90	1 03	16 26	20	26	100
Huntingdon,	15	90	6	90	92	15	90	65	85	1 10	85	54	86	1 22	18 85	21	31	97
Indiana,	12	100	8	100	94	8	70	35	60	1 10	87	53	85	1 04	17 75	23	30	97
Jefferson,	11	100	10	98	83	16	73	37	60	1 15	82	53	88	1 00	18 00	21	28	100
Juniata,	8	80	3	80	86	8	80	70	72	1 04	70	40	83	1 13	16 25	19	32	96
Lackawanna,	8	98	9	98	90	25	90	46	82	1 08	82	57	93	1 25	19 25	25	32	102
Lancaster,	22	94	3	96	95	12	90	70	90	1 11	84	53	90	1 00	19 60	20	36	100
Lawrence,	9	90	6	91	94	14	96	50	80	1 12	82	50	86	1 24	17 65	24	34	106
Lebanon,	8	90	6	92	92	20	86	60	70	1 11	77	48	87	1 00	18 35	19	35	100
Lehigh,	12	95	7	98	97	13	90	87	94	1 14	81	53	98	1 28	18 75	21	36	100
Luzerne,	8	98	9	97	92	16	96	70	90	1 20	82	58	95	1 25	19 80	26	33	98
Lycoming,	18	97	8	96	95	24	80	55	78	1 15	83	52	86	1 21	16 80	22	31	98
McKean,	6	97	9	98	.....	45	.....	.....	.....	1 20	86	54	98	1 24	15 50	26	33	102
Mercer,	16	92	7	92	90	8	92	80	92	1 10	82	52	94	1 10	15 10	22	30	106
Mifflin,	7	90	6	90	97	8	82	68	84	1 07	75	42	81	1 12	19 20	20	31	102
Monroe,	11	98	9	100	93	16	97	80	90	1 18	87	54	92	1 13	17 25	22	30	96
Montgomery,	13	93	4	93	95	8	87	66	80	1 17	87	56	90	1 27	17 65	25	42	100
Montour,	5	97	5	100	98	17	92	80	75	1 07	73	44	91	1 18	17 50	22	33	102
Northampton,	9	101	7	100	92	4	75	63	80	1 14	77	47	92	1 21	19 30	24	38	104
Northumberland,	8	90	5	93	90	.....	80	48	86	1 11	75	50	85	1 10	18 65	23	32	98
Perry,	10	85	3	87	92	15	76	70	70	1 03	71	40	73	1 10	14 80	18	29	98
Philadelphia,	5	90	4	85	100	.....	94	90	94	1 13	88	54	98	1 42	21 50	29	42	100
Pike,	5	.....	.....	100	96	25	95	.....	.....	1 18	85	56	87	1 33	17 80	25	36	102
Potter,	7	96	8	96	.....	.....	96	.....	.....	1 20	80	60	.....	1 00	14 00	20	31	102
Schuylkill,	10	94	9	95	96	25	80	55	82	1 12	88	58	91	1 18	20 20	27	38	105
Snyder,	7	87	4	90	95	20	94	70	80	1 04	73	43	77	90	15 40	20	29	103
Somerset,	13	98	7	98	90	32	95	58	88	1 12	89	55	90	1 06	16 60	22	30	100
Sullivan,	8	98	7	96	88	40	90	90	100	1 17	83	57	92	1 19	13 50	21	28	96
Susquehanna,	11	100	12	100	87	50	100	70	96	1 18	80	56	1 00	1 30	13 25	23	34	98
Tioga,	10	95	8	94	95	55	95	.....	90	1 10	83	53	95	1 30	13 75	21	33	98
Union,	9	95	6	95	95	11	72	65	82	1 10	72	42	86	95	16 90	21	30	100
Venango,	12	94	9	94	88	5	100	70	94	1 12	75	55	90	1 07	15 10	24	30	98
Warren,	10	97	10	97	70	46	100	80	95	1 23	84	56	1 10	1 16	13 90	23	33	100
Washington,	17	98	5	100	94	6	90	50	87	1 05	82	53	90	1 28	15 80	23	32	105
Wayne,	14	.....	14	98	92	46	96	70	94	1 12	80	57	90	1 27	16 00	22	34	98
Westmoreland,	10	102	8	100	90	4	70	37	70	1 08	85	68	93	1 30	17 75	25	36	100
Wyoming,	4	95	7	92	92	25	.....	.....	.....	1 15	82	57	95	1 10	15 75	22	30	100
York,	11	95	4	93	96	40	84	60	80	1 07	74	50	80	1 12	19 00	20	32	100
Total,	.....	95	7	95	92	20	88	63	85	$1 1[illegible]	$0 08	$0 52	$0 89	$1 16	$17 50	$0 23	$0 33	100
Average,	694	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Sheep Killed and Injured by Dogs, Amount of Damages Paid, Number of Dogs Assessed, Dog Tax Collected, How Expended, Etc., in Pennsylvania, by Counties, for the year 1915

Counties	Sheep killed	Sheep injured	Average price paid for sheep killed	Average price paid for sheep injured	Amount paid for sheep killed and injured, including costs	Number of dogs assessed	Amount of tax levied for each male dog	Amount of tax levied for each female dog	Amount of dog tax collected	Number of dogs killed by direction of the county commissioners and tax collectors	Amount expended for the killing of dogs by constables and borough policemen.	Amount expended for the payment of horses, etc., bitten by mad dogs	Amount expended for dog tags
Adams,	4	....	$3 37	....	$19 00	3,842	$0 50	$1 00	$2,006 00	....	....	$146 25	$33 13
Allegheny,	135	49	6 63	$2 02	1,153 25	14,000	1 00	2 00	5,258 10	954	$354 00	531 00	90 00
Armstrong,	95	54	5 50	3 09	836 40	5,424	1 00	2 00	3,752 50	102	119 75	347 50	45 00
Beaver,	133	175	4 20	2 20	1,093 00	3,932	1 00	2 00	1,184 90	18	18 00	352 50	35 00
Bedford,	262	172	5 97	2 79	2,453 60	4,504	75	1 50	3,056 91	36	2 00	....	54 00
Berks,	....	....	....	....	....	9,338	50	50	2,825 00	....	....	....	97 50
Blair,	40	10	5 72	2 80	328 59	3,717	50	1 00	1,500 80	19	22 27	....	113 89
Bradford,	404	218	6 00	2 00	2,837 37	3,874	1 00	2 00	2,843 84	10	2 00	....	87 06
Bucks,	6	1	6 67	6 00	58 50	6,070	50	1 00	3,049 50	39	39 00	9 00	70 00
Butler,	151	134	5 91	3 09	2,140 64	4,000	1 00	2 00	3,895 17	2	....	225 00	42 75
Cambria,	31	39	7 00	4 30	383 25	5,673	1 00	2 00	4,536 00	137	68 50	....	43 75
Cameron,	7	....	4 41	....	37 00	405	75	1 50	300 75	....	....	....	10 32
Carbon,	....	....	....	....	....	2,072	50	50	625 00	....	....	....	37 50
Centre,	40	34	6 72	2 94	438 25	3,719	50	1 00	879 90	3	3 00	....	38 00
Chester,	8	....	9 36	....	75 00	1,981	50	50	546 50	....	....	92 00	27 13
Clarion,	51	38	6 31	3 80	539 00	3,228	50	1 00	1,513 60	20	58 25	263 50	45 00
Clearfield,	45	44	8 75	2 50	557 00	5,238	1 00	2 00	1,857 81	....	....	18 50	59 65
Clinton,	9	4	6 50	2 19	84 87	2,080	50	1 00	1,060 50	....	....	....	25 50
Columbia,	....	....	....	....	....	3,405	....	....	287 65	8	8 00	....	40 00
Crawford,	382	10	6 40	2 90	2,741 50	4,888	1 00	2 00	4,559 00	....	....	....	82 00
Cumberland,	44	21	5 18	1 08	319 12	4,301	25	25	449 50	18	19 75	....	84 60
Dauphin,	44	21	5 18	1 08	....	4,000	25	50	787 32	5	5 00	102 00	56 38
Delaware,	2	....	16 00	....	36 00	4,570	....	....	4,124 43	38	38 00	....	63 00
Elk,	4	....	4 94	....	23 75	2,390	50	50	1,075 00	4	4 00	....	33 75
Erie,	189	54	7 35	4 45	1,718 30	5,235	1 00	2 00	5,362 85	4	4 00	....	89 45
Fayette,	156	69	6 24	2 76	1,379 00	7,678	50	1 00	3,689 61	45	45 00	543 00	60 00
Forest,	10	19	5 26	1 46	156 25	700	1 00	2 00	609 00	....	....	....	11 50
Franklin,	73	99	6 24	3 06	810 85	4,236	35	35	763 90	3	3 00	....	38 50
Fulton,	60	30	5 75	2 91	563 05	1,275	25	50	347 30	....	....	....	14 95
Greene,	423	684	4 28	1 34	3,465 40	2,946	2 00	4 00	4,990 00	139	139 00	133 00	37 50

Huntingdon,	143	48	5 97	3 00	1,097 75	3,400	75	1 00	2,224 75	......	......	......	26 25
Indiana,	95	93	6 85	4 04	1,210 85	4,179	1 50	3 00	2,501 50	150	150 00	43 50	49 50
Jefferson,	33	41	8 02	4 61	525 50	4,414	1 00	2 00	3,244 00	14	10 00	......	62 50
Juniata,	11	2	7 24	5 25	118 25	1,600	25	50	227 71	......	......	104 00	58 50
Lackawanna,	14	7	7 00	2 29	128 00	2,381	1 00	2 00	1,305 59	......	......	73 00	37 50
Lancaster,	19	8	4 98	......	160 35	7,392	50	1 00	3,513 50	......	......	......	63 00
Lawrence,	72	173	5 55	2 85	1,092 80	3,436	1 00	3 00	2,056 30	30	37 50	......	41 13
Lebanon,	......	......	......	......	......	......	......	......	......	......	......	......	......
Lehigh,	51	......	11 00	......	577 91	......	......	......	......	......	......	......	......
Luzerne,	4	......	6 25	......	25 00	9,120	40	40	2,840 41	2	2 00	......	135 00
Lycoming,	32	14	6 55	3 07	323 00	4,206	50	1 00	2,103 62	8	......	......	31 10
McKean,	107	89	9 69	......	1,232 25	2,683	1 00	3 00	2,802 00	70	70 00	......	37 50
Mercer,	204	346	4 90	2 22	3,908 75	4,013	2 00	4 00	6,081 58	44	44 00	543 16	42 00
Mifflin,	29	16	5 08	3 13	230 00	2,039	50	1 00	332 00	......	......	......	15 00
Monroe,	16	2	5 19	1 50	98 00	2,257	50	1 00	775 66	4	4 00	......	38 55
Montgomery,	3	......	15 00	......	49 00	8,693	50	2 00	2,931 00	......	......	52 00	66 00
Montour,	......	......	......	......	......	990	50	50	475 00	......	3 00	20 00	17 40
Northampton,	12	......	10 65	......	148 67	5,153	25	1 00	203 42	......	8 00	80 00	48 13
Northumberland,	......	......	......	......	......	1,051	50	1 00	824 94	13	15 00	......	64 00
Perry,	12	3	6 87	1 83	154 50	2,690	20	50	635 00	......	......	......	37 00
Philadelphia,	......	......	......	......	......	......	......	......	......	......	......	......	......
Pike,	9	7	5 11	2 15	73 25	1,085	25	1 00	341 50	......	......	......	19 78
Potter,	105	74	5 77	3 31	995 00	1,802	50	1 00	767 20	11	12 50	......	31 25
Schuylkill,	......	......	......	......	......	7,989	50	50	2,778 81	......	......	......	67 50
Snyder,	......	......	......	......	......	1,832	15	50	170 78	......	......	......	20 50
Somerset,	107	61	5 89	2 27	989 52	5,292	1 00	4 00	2,661 00	75	75 00	......	50 00
Sullivan,	43	35	6 74	3 09	492 00	1,085	1 00	2 00	1,158 00	......	......	......	16 90
Susquehanna,	......	......	......	......	......	......	......	......	......	......	......	......	......
Tioga,	319	262	6 69	3 38	3,402 70	3,136	1 00	1 50	3,348 50	......	......	......	......
Union,	......	......	......	......	......	1,074	......	......	181 89	......	......	......	15 60
Venango,	76	72	5 44	2 89	810 50	2,668	1 00	2 00	2,347 00	......	......	......	54 00
Warren,	108	71	6 94	2 60	942 00	2,447	50	50	879 65	......	......	......	17 56
Washington,	1 154	1,152	4 15	1 74	8,056 70	......	1 50	3 00	7,058 00	286	286 00	735 00	164 75
Wayne,	71	43	7 50	6 00	836 00	2,512	1 00	2 00	1,585 00	......	16 00	......	37 50
Westmoreland,	169	80	6 75	3 37	1,726 00	9,853	1 00	2 00	6,807 35	1,052	1,052 00	44 00	143 77
Wyoming,	24	117	6 72	1 50	393 25	1,642	1 00	3 00	1,211 70	10	10 00	......	33 80
York,	2	1	7 87	1 00	20 00	8,276	25	50	2,267 50	......	......	44 50	55 00
Total,	5,808	4 764	......	......	$53,969 44	263,511	......	......	$135,278 70	3,354	$3,342 52	$4,502 41	$3,194 76
Average,	......	......	$6 60	$2 87	......	......	$0 73	$1 48	......	......	......	......	......

Remarks: Under a special act, each township and borough in Susquehanna county collects its own dog tax and pays its own damages.

Lebanon and Lehigh counties levied no dog tax. No report as to the number of dogs assessed in Washington county.

It will be observed that the above statement relates only to the dog tax collected in the townships and boroughs of the State.

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION OF CROPS, LIVESTOCK, ETC., MAY 1, 1916.

The following report is compiled from the returns received from the official correspondents of the Department.

Wheat—Condition compared with average years,	96 per cent
Rye—Condition compared with average years,	97 per cent
Clover and Timothy—Condition of sod for this year's hay,	100 per cent
Fruit—Prospect compared with a normal yield:	
Apple,	91 per cent
Pear,	88 per cent.
Peach,	63 per cent.
Plum,	79 per cent.
Cherry,	89 per cent.
Apricot,	74 per cent.
Spraying—Farmers spraying for insect pests and plant diseases,	25 per cent
Livestock—Losses during winter and spring:	
Horses,	2 per cent.
Cattle,	2 per cent
Sheep,	2 per cent.
Hogs,	2.5 per cent.
Farmers that are unable to get the male help that they desire and need,	22 per cent.
Estimated average amount expended by each farmer in Pennsylvania for male farm help,	$176 00
Total estimated amount expended annually by the farmers of this State for male farm help in the usual farm activities,	$38,500,000 00

REVIEW OF CROP AND LIVESTOCK CONDITIONS, MAY 1, 1916.

The condition of wheat compared with an average is ninety-six per cent. which is a slight improvement over one month ago and five per cent. better than at this time last year. The present indications are that the crop will be about 16.5 bushels per acre. The crop will probably be above or below these figures according as the change in condition from now until harvest is above or below the average condition.

The condition of rye compared with an average is ninety-seven per cent. which is two per cent. better than a month ago and five per cent. better than one year ago. Present indications are that the production will be something over sixteen bushels per acre.

Clover and timothy sod is in good condition and fully up to the average. The production this year, according to present indications, will be about 1.4 tons per acre.

The prospect for fruit is not much changed from the forecast last month. The prospect for peaches in the state at large is the same as a month ago, but an examination of the detailed report will show that the prospect has materially improved in the principal peach belt and lowered in other parts of the state where the peach is not a staple crop. We are safe in predicting at the present time the production of three-fourths of a full crop.

The loss of horses and sheep during the winter and spring was about the same as one year ago. The loss of cattle and hogs was less than one year. The livestock went into winter in good condition and the weather during the winter and spring was favorable. This largely accounts for a smaller mortality than usually.

CROP AND LIVESTOCK REPORT

Report of the Pennsylvania Department of Agriculture on the Condition of Crops, Livestock, etc., May 1, 1916

Counties	Number reports filed	Wheat—Condition of wheat compared with an average at this season of the year	Rye—Condition of rye compared with an average at this season of the year	Clover and Timothy—Condition of sod for this year's hay compared with an average	Fruit—Prospects Compared With Normal Yield						Livestock—Losses During Winter and Spring				Percentage of farmers that are unable to get the male farm help that they desire and need	Average amount expended annually by each farmer for male farm help in the usual farm activities
					Apple	Pear	Peach	Plum	Cherry	Spraying — Farmers spraying for insect pests and plant diseases	Horses	Cattle	Sheep	Hogs		
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Adams,	9	92	92	92	90	82	68	76	90	42	3	3	2	3	24	$176 00
Allegheny,	17	97	96	100	77	88	45	72	88	38	3	2	....	3	45	216 00
Armstrong,	9	98	97	98	84	80	26	50	76	28	2	2	3	3	28	60 00
Beaver,	9	90	91	100	86	84	50	65	85	36	3	3	3	4	30	180 00
Bedford,	12	94	95	98	92	84	72	83	90	40	2	2	2	2	16	136 00
Berks,	21	98	98	100	88	92	82	90	90	20	3	2.5	....	5	25	270 00
Blair,	8	96	96	100	90	94	52	77	95	22	2	3	1	2.5	27	250 00
Bradford,	13	98	98	108	90	88	62	35	86	25	3	2.5	3	3	20	120 00
Bucks,	13	95	96	98	87	92	82	90	92	35	3	2	....	5	32	365 00
Butler,	18	90	94	103	80	85	37	56	75	20	2	2	2	2.5	24	75 00
Cambria,	11	97	95	102	97	94	35	70	83	18	3	2.5	....	2.5	28	122 00
Cameron,	3	95	98	98	96	86	....	80	90	25	....	....	....	....	....	....
Carbon,	5	103	102	104	96	100	70	75	97	36	5	3	....	4	15	82 00
Centre,	10	100	98	100	87	83	62	54	90	18	2.4	2	1.5	3	8	196 00
Chester,	20	94	95	99	90	98	90	93	96	16	2	2	....	1.5	26	380 00
Clarion,	9	102	97	98	90	86	40	66	75	16	2	3	1	1.5	8	98 00
Clearfield,	11	101	98	106	100	100	58	78	94	18	2	3	....	2.5	23	120 00
Clinton,	5	101	100	98	98	98	90	98	98	25	....	....	....	....	....	....
Columbia,	11	97	98	97	86	84	56	70	86	30	3	3	....	2.5	16	117 00
Crawford,	11	93	93	105	98	100	80	94	96	8	2.5	3	3	4	10	114 00
Cumberland,	12	94	96	95	85	90	75	77	95	45	2	2	2	2.5	19	282 00
Dauphin,	11	95	96	100	93	96	83	94	95	33	2	1.5	....	3	20	167 00
Delaware,	8	90	92	96	82	80	80	80	85	42	1.5	1.5	1	4	45	400 00
Elk,	5	90	95	104	98	88	....	....	....	12	....	....	....	....	....	100 00
Erie,	10	96	95	106	100	92	60	75	90	16	1.5	2.5	1.5	1.5	33	114 00
Fayette,	10	98	100	103	83	72	....	50	80	12	1.5	1.5	....	2.5	30	120 00
Forest,	7	98	97	98	96	86	....	90	83	....	....	....	....	....	....	100 00
Franklin,	9	96	95	98	96	94	72	78	94	44	2.5	2	1	3	10	255 00

CROP AND LIVESTOCK REPORT—Continued

Counties	Number reports filed	Wheat—Condition of wheat compared with an average at this season of the year	Rye—Condition of rye compared with an average at this season of the year	Clover and Timothy—Condition of sod for this year's hay compared with an average	Fruit—Prospects Compared With Normal Yield						Livestock—Losses During Winter and Spring				Percentage of farmers that are unable to get the male farm help that they desire and need	Average amount expended annually by each farmer for male farm help in the usual farm activities
					Apple	Pear	Peach	Plum	Cherry	Spraying — Farmers spraying for insect pests and plant diseases	Horses	Cattle	Sheep	Hogs		
	%	%	%	%	%	%	%			%	%	%	%	%	%	%
Fulton,	8	90	92	102	90	87	80	90	95	15	2	1.5	2	1	6	150 00
Greene,	8	97	98	98	93	50	20	56	70	15	1	1.5	2	1	14	87 00
Huntingdon,	15	93	93	96	93	90	68	92	95	14	1.5	2	2	2	20	158 00
Indiana,	12	98	99	104	90	65	25	48	56	13	1.5	1.5	3	3.5	18	112 00
Jefferson,	11	98	98	102	90	70	25	52	68	10	3	2	....	4	18	110 00
Juniata,	8	85	87	96	90	85	80	85	90	16	2	1	3	3	9	140 00
Lackawanna,	8	99	97	98	90	88	....	....	....	30	1.5	2.5	....	....	50	187 00
Lancaster,	23	94	96	100	90	87	80	80	90	40	1.5	1	1	2	12	335 00
Lawrence,	9	88	90	105	98	82	68	82	96	40	1.5	2	1.5	2	11	127 00
Lebanon,	8	92	92	98	90	85	72	76	88	40	3	3	....	3	30	240 00
Lehigh,	11	96	97	98	86	90	80	92	95	25	2.5	3	....	3.5	20	238 00
Luzerne,	9	97	98	98	90	96	62	87	90	50	2.5	2	....	1.5	15	174 00
Lycoming,	16	97	97	100	84	90	76	72	84	23	2.5	2	2	3	17	130 00
McKean,	4	92	96	100	100	....	....	....	....	25	2	1.5	....	....	15	180 00
Mercer,	15	95	96	107	105	97	63	90	86	30	2	2	4	2	16	75 00
Mifflin,	7	96	95	96	87	86	73	80	90	24	3	2.5	4	4	30	200 00
Monroe,	11	104	105	102	90	90	63	82	88	27	2.5	2	2	2	15	91 00
Montgomery,	11	94	95	100	88	87	60	76	84	29	1.5	2.5	....	2	35	304 00
Montour,	5	100	96	98	83	85	63	56	90	30	....	....	....	....	30	212 00
Northampton,	8	102	98	98	80	83	75	86	95	28	3	3.5	....	5	34	221 00
Northumberland,	8	92	94	96	95	90	67	75	90	18	1.5	1	....	1.5	8	152 00
Perry,	10	90	88	95	90	90	87	80	90	28	2.5	2	1	3	22	165 00
Philadelphia,	5	90	88	100	98	100	96	94	100	16	2	1.5	....	2	60	538 00
Pike,	4	100	98	100	95	95	....	....	....	....	2	2	....	....	30	183 00
Potter,	8	96	97	100	100	100	....	95	85	8	1.5	2	1.5	1	5	170 00
Schuylkill,	10	97	98	106	88	94	70	80	94	50	2	2	....	....	20	305 00
Snyder,	6	95	95	100	95	92	70	75	93	20	2	2	....	2.5	30	113 00
Somerset,	13	106	102	105	96	94	52	80	90	8	2	2	2	2	18	174 00
Sullivan,	8	102	98	10'	95	90	85	92	95	14	2.5	2.5	2.5	2.5	25	65 00
Susquehanna,	9	100	100	105	100	90	75	94	100	20	2	2.5	1.5	1.5	26	218 00

Tioga,	10	96	94	104	98	96	....	95	94	14	2	2.5	2.5	2	15	175 00
Union,	8	97	97	100	74	80	76	80	85	18	2.5	2.5	....	3.5	10	180 00
Venango,	11	92	93	102	96	90	....	78	95	17	2	2	3	2	28	70 00
Warren,	9	95	94	100	100	100	60	100	98	18	2	2.5	2	2	25	97 00
Washington,	14	97	98	100	84	80	40	60	80	24	2	2	3.5	2	15	130 00
Wayne,	12	100	100	102	92	92	60	90	93	18	2.5	2.5	....	2.5	14	150 00
Westmoreland,	9	97	100	102	80	76	15	40	74	14	3	3.5	2	4	15	188 00
Wyoming,	5	95	93	98	100	82	25	80	100	25	....	....	....	....	8	129 00
York,	13	96	95	96	87	86	75	76	92	50	3	4	2	3	28	177 00
Total,	676	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Average,	....	96	97	100	91	88	63	79	89	25	2	2	2	2.5	22	$176 00

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION OF CROPS, LIVESTOCK, ETC., JUNE 1, 1916.

The following report is compiled from the returns received from the official correspondents of the Department:

Wheat—Condition compared with an average,	98 per cent.
Estimated acreage to be harvested this year, 1,333,540	
Rye—Condition compared with an average,	98 per cent.
Estimated acreage to be harvested this year, 266,000	
Oats—Condition compared with an average,	90 per cent.
Acreage sown this year compared with last,	96 per cent.
Estimated acreage sown for this year's harvest, 1,050,680	
Clover and Timothy—Prospect for average yield of hay,	103 per cent.
Fruit—Prospect compared with a normal yield:	
Apple,	93 per cent.
Pear,	83 per cent.
Peach,	60 per cent.
Plum,	70 per cent.
Cherry,	89 per cent.
Wool—Number of fleeces clipped compared with last year,	97 per cent.
Estimated weight per fleece,	6.3 pounds.
Lambs—Number compared with last year,	95 per cent.
Spring Pigs—Number compared with last year,	90 per cent.
Cream Separators—Farmers using cream separators,	38 per cent.

REVIEW OF CROP AND LIVESTOCK CONDITION, ETC., JUNE 1, 1916.

Wheat has shown a steady improvement during the spring and now stands at 98 per cent. compared with an average at this time of the year. The present indications are that the yield will be approximately 17.2 bushels per acre. The crop will probably be above or below these figures according as the change in condition from now until harvest is above or below the average condition. Very little wheat throughout the State was winter-killed, and only one-third of one per cent. was plowed down. This leaves an estimated acreage of 1,333,540 acres to be harvested.

The condition of rye compared with an average is ninety-eight per cent., which is an improvement of one per cent. over last month and four per cent. better than at this time last year. Present indications are that the yield will be about 16.6 bushels per acre.

The area sown to oats is estimated at 1,050,680 acres. This is four per cent. smaller than last year. This decrease is largely due to the cold and wet weather that prevailed at oats sowing time. Many farmers could not get the ground in proper condition for seeding. Then, it must be remembered, that a larger acreage was sown to oats last year than usually. The late sowing and unfavorable weather are responsible for the condition of the oats being below an average at the present time. Present indications are that the yield will be a little over 27.5 bushels per acre.

The condition of clover and timothy is three per cent. better than last month and sixteen per cent. better than last year at this time. The indications are now that the yield will reach one and two-fifths and probably one and one-half tons of hay per acre.

Our next report will contain information relative to the acreage and condition of corn and potatoes.

The prospect for fruit is not much changed from last month. See detailed report.

The number of fleeces of wool clipped appears from a careful estimate to be 630,500. This is three per cent. smaller than last year, but it will be observed that statistics show that the decline in the number of sheep in this State is three per cent. annually. The average weight of fleece is 6.3 pounds. This fixes the total weight of the clip in this State at 3,972,150 pounds.

The number of lambs seems to be five per cent. smaller than last year.

The number of spring pigs is ten per cent. smaller than last year. This marked decrease is largely due to the high price of hogs as well as the attractive price of pork that prevailed last fall, consequently not as many brood sows were kept over the winter as usually. Then, reports say, that many pigs were lost this spring at farrowing time.

Reports show that thirty-eight per cent. of the farmers are using cream separators in this State. The whole number in use is estimated at 83,300.

On the whole a spirit of optimism pervades the hearts of the Pennsylvania farmers, and the rural population can find little cause for complaint at the present time.

The following information is furnished by Mr. George S. Bliss, Section Director, U. S. Department of Agriculture, Local Office of the Weather Bureau, Philadelphia:

WEATHER AND CROP SUMMARY FOR THE MONTH OF MAY.

"The month as a whole was seasonable and pleasant. There was a slight temperature excess at most stations, which partly counteracted the effects of the low temperatures during April. The rainfall was generally somewhat below the normal, which was decidedly favorable as there was too much water in the soil during the fore part of the month. Work in the fields and gardens was delayed in some places until the soil had time to dry out to a workable condition. On that account seeding and planting were generally from a week to two weeks late. The excess of moisture in the soil was not unfavorable for winter wheat, pastures and meadows, which made a good growth and were in excellent condition. Orchards blossomed a little later than usual, which was fortunate, as they were not materially injured by the frost which covered the greater portion of the State on the 19th. In consequence, the orchards were in fine condition at the end of the month, and all fruits except peaches were decidedly promising. Corn and potato planting were still in progress in the northern counties at the end of the month, but were practically finished elsewhere. Gardens were a little late, but otherwise were good. Several heavy hail storms occurred on the 25th, but did no material damage."

CROP AND LIVESTOCK REPORT.

Report of the Pennsylvania Department of Agriculture on the Condition of Crops, Livestock, Etc., June 1, 1916.

Counties	Number reports filed	Wheat	Rye	Oats			Fruit—Prospect Compared With Normal Yield					Wool		Lambs	Pigs	Cream Separators — Farmers using cream separators
		Condition of wheat compared with an average at this season of the year	Condition of rye compared with an average at this season of the year	Acreage sown this year compared with last year	Condition compared with an average at this season of the year	Clover and Timothy—Prospect for average yield of hay	Apple.	Pear	Peach	Plum	Cherry	Number of fleeces clipped compared with last year	Average weight of fleeces	Number of lambs compared with average years	Number of spring pigs compared with average years	
		%	%	%	%	%	%	%	%	%	%	%	lbs.	%	%	%
Adams,	9	95	94	90	90	100	72	70	60	62	80	97	7	96	85	45
Allegheny,	16	100	100	105	92	102	75	80	30	65	83	98	....	98	90	28
Armstrong,	9	104	103	98	90	108	88	66	20	55	70	96	6.8	95	88	20
Beaver,	10	94	95	98	92	104	94	70	55	72	93	98	6.8	92	85	50
Bedford,	11	99	100	95	92	100	95	78	60	82	92	96	6	94	97	60
Berks,	22	104	102	98	92	103	90	90	80	80	85	97	7.3	97	90	15
Blair,	9	96	95	94	87	95	92	87	45	85	83	94	6.2	92	87	45
Bradford,	10	106	105	94	92	110	100	86	66	80	93	99	6	100	101	40
Bucks,	14	99	99	98	94	99	88	70	81	84	94	99	5.5	96	90	18
Butler,	17	96	98	97	90	110	90	68	13	42	83	97	6.2	94	94	33
Cambria,	11	98	95	96	87	106	94	80	18	22	81	98	5.5	94	92	60
Cameron,	5	95	100	95	93	100	100	90	45	40	62	100	7.6	98	80	33
Carbon,	5	105	105	101	92	103	106	102	90	80	105	....	....	....	101	44
Centre,	12	100	98	97	85	103	98	95	72	76	100	92	6.2	92	96	62
Chester,	21	98	98	95	92	103	78	55	80	77	92	97	6	98	88	5
Clarion,	12	105	100	97	88	108	100	77	45	50	88	95	6.4	92	88	40
Clearfield,	11	102	102	100	85	102	94	53	45	60	85	98	6	93	90	44
Clinton,	6	104	102	97	100	100	100	38	75	92	100	96	5	100	86	40
Columbia,	7	100	100	95	95	103	94	86	60	75	87	92	6	90	81	40
Crawford,	14	106	98	90	92	108	106	97	52	90	92	99	7.3	98	88	40
Cumberland,	13	98	100	96	93	100	86	90	75	80	94	100	7.5	99	91	28
Dauphin,	11	98	97	99	86	98	82	80	80	77	93	96	7.3	93	84	50
Delaware,	8	96	98	100	95	98	82	77	85	80	95	100	6.5	100	95	6
Elk,	6	97	98	98	90	106	102	75	....	40	62	98	6.5	94	95	52

Erie,	10	100	100	92	84	112	113	100	48	88	108	96	5.6	96	86	46
Fayette,	12	98	100	98	88	100	81	50	5	80	44	88	5.7	96	91	24
Forest,	6	100	96	101	96	108	108	72	25	70	96	100	7	92	90	20
Franklin,	10	96	97	92	88	100	90	87	73	72	95	94	7	91	84	25
Fulton,	8	92	93	88	85	103	87	77	80	80	96	95	6	97	80	87
Greene,	9	96	98	93	92	95	84	87	....	42	50	95	6.2	101	98	12
Huntingdon,	14	96	95	98	95	100	90	58	78	88	102	100	6	97	89	40
Indiana,	13	100	99	94	90	112	82	56	5	42	56	92	5.3	85	78	24
Jefferson,	11	100	100	93	85	110	86	48	18	22	60	90	5.9	90	78	24
Juniata,	7	90	88	92	82	95	93	85	85	88	100	92	7	85	68	5
Lackawanna,	8	100	102	97	98	105	105	96	20	66	90	103	6	98	102	20
Lancaster,	23	100	99	94	92	105	90	90	78	72	98	99	7.5	96	96	30
Lawrence,	10	90	92	94	85	108	95	78	54	76	92	96	6.5	92	94	44
Lebanon,	8	96	93	93	89	100	86	82	74	83	85	98	7	100	94	9
Lehigh,	12	98	100	97	93	98	92	85	82	80	88	....	....	....	96	34
Luzerne,	9	100	100	97	90	100	98	90	64	80	93	97	5	92	94	32
Lycoming,	18	99	96	96	93	104	94	92	80	80	90	97	6.5	97	88	65
McKean,	7	98	98	90	96	104	105	....	....	....	....	98	5.5	98	97	40
Mercer,	15	95	96	96	90	110	110	90	65	84	92	100	6.4	100	90	58
Mifflin,	9	98	98	93	97	102	90	76	55	70	94	94	7	93	85	65
Monroe,	11	105	105	98	92	107	100	92	72	77	100	96	6.5	93	96	30
Montgomery,	13	94	95	93	88	95	84	80	68	68	80	99	4.5	100	92	8
Montour,	5	102	100	95	93	93	94	92	72	70	94	96	7	95	90	54
Northampton,	9	103	102	97	90	98	80	76	84	82	84	100	7	98	90	22
Northumberland,	9	93	96	97	86	92	94	85	67	72	93	98	7	90	89	48
Perry,	10	92	92	96	92	90	78	76	88	82	98	98	6	97	83	62
Philadelphia,	6	95	92	98	98	104	90	94	98	88	90	100	6	96	95	7
Pike,	5	96	97	99	94	106	102	104	50	95	100	93	5	90	90	40
Potter,	11	98	98	88	85	112	103	94	....	90	97	98	6	98	87	57
Schuylkill,	11	98	103	101	104	93	86	68	67	67	90	100	5.5	97	92	33
Snyder,	8	98	98	97	88	97	86	87	72	83	98	100	7.5	100	97	60
Somerset,	12	103	100	102	96	106	92	85	10	25	77	97	5.8	95	90	75
Sullivan,	8	102	102	99	93	105	100	68	75	68	100	93	5.4	92	82	50
Susquehanna,	12	104	104	97	88	105	112	95	68	95	103	92	5.4	95	100	18
Tioga,	10	97	96	96	86	110	103	100	70	100	100	95	5.6	94	80	35
Union,	9	100	98	94	86	97	72	70	80	60	88	95	6.5	90	82	38
Venango,	12	95	95	96	90	110	105	72	30	52	82	95	6	95	90	38
Warren,	11	95	92	100	92	105	101	92	80	90	90	97	5.3	97	88	64
Washington,	18	97	98	97	88	98	83	70	24	52	74	97	7.2	96	80	38
Wayne,	12	95	103	93	90	107	113	101	70	90	96	95	6.6	90	96	24
Westmoreland,	8	98	98	101	88	107	77	58	5	10	75	98	7	93	86	46
Wyoming,	5	100	98	85	75	106	100	93	40	60	105	107	6.5	106	92	35
York,	16	102	100	98	90	106	90	56	80	87	92	97	7	94	92	44
Total,	719	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Average,	....	99	99	96	90	102	93	83	60	70	89	97	6.3	95	90	38

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION OF CROPS, LIVESTOCK, ETC., JULY 1, 1916

The following report is compiled from the returns received from the official correspondents of the Department:

Wheat—Condition compared with an average,	100 per cent.
Rye—Condition compared with an average,	100 per cent.
Oats—Condition compared with an average,	95 per cent.
Corn—Acreage planted compared with last year,	96 per cent.
Estimated acreage planted,	1,461,120
Condition compared with an average,	81 per cent.
Clover and Timothy—Condition compared with an average,	106 per cent.
Potatoes—Acreage planted compared with last year,	97 per cent.
Estimated acreage planted,	265,200
Condition compared with an average,	90 per cent.
Fruit—Prospect compared with a normal yield:	
Apple,	88 per cent.
Pear,	75 per cent.
Peach,	55 per cent.
Plum,	66 per cent.
Cherry,	87 per cent.
Raspberries,	97 per cent.
Blackberries,	98 per cent.
Strawberries—Average price per quart,	10 cents.
Colts—Number compared with average years,	94 per cent.
Calves—Number compared with average years,	100 per cent.

REVIEW OF CROP AND LIVESTOCK CONDITIONS, JULY 1, 1916.

Reports from seven hundred and three correspondents indicate that the condition of wheat at the beginning of harvest is 100 per cent. compared with an average at this season of the year. This is two per cent. better than one month ago and six per cent. better than one year ago. The total estimated yield last year was 24,928,000 bushels. The present forecast is that the yield this year will be approximately 26,500,000. More reliable information will be collected on August first and final data on October first.

The condition of rye compared with an average is 100 per cent., which is an improvement of two per cent. over last month and four per cent. better than at this time last year. The indications are that the total production this year will be about 4,750,000 bushels.

The condition of oats stands at 95 per cent. compared with 104 per cent. on July first last year. It is estimated from present appearance that the total production this year will reach 38,500,000. The oats have improved materially during the past month.

Corn was planted very late all over the State because the ground could not be gotten in proper condition. The weather has not been favorable since the corn was planted, consequently the condition is not good and stands at 81 per cent. compared with an average at this season of the year. The wire and cut worms have done material damage to the crop too. The acreage planted is four per cent. smaller than last year and is fixed at 1,461,120 acres.

The same condition that affected the acreage and condition of the corn has lowered the acreage of potatoes as well as the condition at the present time. The estimated acreage planted this year is 265,200. The condition is ten per cent. lower than an average at this time in the year.

The condition of clover and timothy is six per cent. better than an average and twenty-six per cent. better than on July first last year. Hay is a heavy crop and will reach an average of nearly one and one-half tons per acre. August first report will give acreage and average production per acre.

Owing to the heavy drop during the past month the prospect for fruit has been slightly lowered. See detailed report.

The number of spring calves seems to be up to the average but the number of colts is estimated at 94 per cent. compared with average years. The decrease in the number of colts no doubt is due largely to the fact that many brood mares have been sold for services in the European war. The attractive prices have induced many farmers to sell all horses not actually needed.

The following information is furnished by Mr. George S. Bliss, Section Director, U. S. Department of Agriculture, Local Office of the Weather Bureau, Philadelphia:

CLIMATE AND CROP SUMMARY FOR JUNE. (PENNSYLVANIA.)

"The prevailing low temperature and westerly winds made for personal comfort throughout the month, but were not wholly favorable for agriculture. Frequent rains, during the first three weeks, kept the soil in an almost saturated condition and made cultivation difficult and slow of progress. Corn fields and gardens became weedy, and the crops did not make proper growth. The corn was generally a good stand, but backward. During the last week the rains were light and the soil dried out to a good condition. Cultivation progressed rapidly and the corn improved considerably. The large amount of moisture was favorable for pastures and meadows, which flourished under such conditions and were excellent. Wheat and oats were generally good, although reports from some places were to the effect that the wheat was not filling well. The wheat was ripe in the southern counties at the end of the month and promised nearly a normal yield. The planting of tobacco and late potatoes was delayed by the condition of the soil. Orchard fruits were mostly good. Apples and pears promised a full crop and cherries were plentiful, but peaches were generally reported as light. There were about the usual number of thunderstorms, a few of which were severe and resulted in the loss of considerable property by fire. A few people were injured, but no deaths were reported."

CROP AND LIVESTOCK REPORT

Report of the Pennsylvania Department of Agriculture on the Condition of Crops, Livestock, Etc., July 1, 1916.

Counties	Number reports filed	Cereals					Clover and Timothy—Condition compared with an average	Potatoes		Fruit—Prospect Compared with a Normal Yield							Strawberries—Average price per quart	Colts—Number compared with average years	Calves—Number compared with average years
		Wheat — Condition compared with an average	Rye—Condition compared with an average	Oats—Condition compared with an average	Corn—Acreage planted compared with last year	Corn—Condition compared with an average		Acreage planted compared with last year	Condition compared with an average	Apple	Pear	Peach	Plum	Cherry	Raspberries	Blackberries			
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%		%	%
Adams,	9	95	95	94	99	86	105	97	90	80	65	60	58	85	96	92	$0 09	85	97
Allegheny,	16	102	101	100	95	86	106	101	100	66	68	25	45	83	94	95	10	96	101
Armstrong,	9	106	104	105	99	82	112	96	96	82	60	18	40	67	100	96	10	92	101
Beaver,	9	95	97	100	93	75	106	97	90	80	58	42	50	88	90	95	10	100	100
Bedford,	12	101	101	98	99	94	106	102	100	88	68	65	78	100	100	100	10	92	100
Berks,	22	106	103	95	99	90	110	100	93	90	90	85	87	86	99	98	10	95	101
Blair,	8	100	96	93	90	75	103	95	84	83	72	40	82	90	95	97	10	98	95
Bradford,	12	104	104	97	80	70	115	85	78	92	85	70	87	105	98	101	12	98	98
Bucks,	13	100	100	98	100	85	105	97	94	83	84	74	77	76	95	97	10	95	96
Butler,	17	98	98	98	98	76	112	96	88	90	55	20	40	76	96	100	10	98	101
Cambria,	11	97	96	88	92	70	105	97	80	82	62	20	22	72	96	98	10	90	100
Cameron,	5	94	98	92	94	77	102	98	90	100	90	37	50	80	90	97	12	98	98
Carbon,	3	105	103	96	100	82	110	103	95	97	93	97	87	105	97	95	11	96	100
Centre,	11	105	102	94	96	85	113	98	92	100	83	66	74	100	98	98	10	96	100
Chester,	21	101	98	98	101	85	107	98	94	74	74	75	76	87	92	95	11	94	100
Clarion,	12	104	99	98	97	80	108	98	88	93	60	40	46	77	93	94	11	94	97
Clearfield,	10	102	101	104	92	76	114	90	78	90	78	45	60	88	103	106	10	92	102
Clinton,	9	106	105	98	95	90	112	98	93	102	90	70	77	100	105	98	11	97	100
Columbia,	7	105	100	98	98	87	108	97	94	88	88	60	65	97	97	96	10	94	98
Crawford,	12	98	96	92	95	74	109	98	92	96	85	48	76	84	105	105	09	94	97
Cumberland,	12	98	101	99	102	92	102	99	94	85	85	76	86	100	98	97	09	98	96
Dauphin,	12	101	99	97	103	93	104	98	93	75	72	78	75	102	96	99	09	90	93
Delaware,	6	100	99	98	100	86	103	98	97	70	70	75	80	90	92	94	10	98	100
Elk,	4	100	100	88	96	66	110	100	86	101	54	......	42	60	......	100	10	96	102

Erie,	9	100	98	98	92	75	112	95	84	106	98	48	72	100	100	102	10	96	98
Fayette,	12	100	100	96	99	82	104	100	95	65	25	......	22	35	80	86	11	93	100
Forest,	6	100	98	94	95	75	104	100	93	105	60	25	70	94	98	110	12	90	100
Franklin,	10	98	99	92	100	87	104	100	97	88	76	70	76	102	102	100	09	97	98
Fulton,	8	95	97	94	99	83	106	98	96	82	65	76	80	95	100	95	10	99	100
Greene,	9	100	101	103	103	88	95	102	97	66	45	......	25	45	98	100	11	97	104
Huntingdon,	14	98	97	97	95	84	103	95	90	96	75	76	80	100	94	96	10	95	99
Indiana,	11	102	101	99	97	78	106	98	90	82	56	......	20	50	92	92	10	88	100
Jefferson,	11	100	101	85	96	76	108	95	86	85	45	22	55	60	97	97	10	80	97
Juniata,	6	94	96	95	96	80	92	98	86	75	65	72	60	100	95	100	10	85	95
Lackawanna,	8	95	101	90	85	65	105	85	75	85	65	20	55	65	90	90	11	95	100
Lancaster,	21	101	100	95	100	94	108	103	92	90	76	75	68	90	98	100	09	99	101
Lawrence,	10	96	96	92	96	85	110	96	86	90	70	50	86	88	100	102	10	95	100
Lebanon,	8	96	97	95	100	86	104	100	95	85	80	68	75	75	92	95	09	92	102
Lehigh,	12	98	100	95	98	86	100	100	92	82	80	82	75	80	95	96	11	94	102
Luzerne,	9	101	101	96	95	80	104	96	94	97	72	62	65	90	96	100	10	92	101
Lycoming,	16	99	98	95	97	82	105	97	92	88	88	75	75	96	94	99	11	97	101
McKean,	7	101	100	90	90	70	108	85	83	84	......	......	......	......	100	103	12	101	102
Mercer,	14	96	97	98	94	80	112	98	92	108	88	56	77	100	100	102	09	94	99
Mifflin,	9	97	99	96	95	82	102	93	85	90	70	65	70	102	100	100	10	90	99
Monroe,	12	102	104	97	97	80	108	99	92	88	85	70	85	92	97	98	11	95	100
Montgomery,	13	98	97	90	101	84	104	98	92	78	86	66	65	80	90	92	11	95	98
Montour,	5	101	100	97	95	83	98	100	97	87	84	75	80	93	102	102	10	92	98
Northampton,	8	105	103	95	98	92	98	99	92	84	85	82	80	87	95	94	11	97	100
Northumberland,	9	96	96	99	97	88	99	97	98	85	85	65	68	88	100	100	09	90	94
Perry,	9	96	96	102	100	86	103	94	94	78	80	52	87	105	94	98	10	90	99
Philadelphia,	6	100	97	96	101	90	107	101	100	80	78	85	76	92	94	100	10	97	100
Pike,	6	95	96	96	92	70	104	100	86	96	98	60	70	95	93	95	12	96	95
Potter,	10	96	100	88	85	72	108	85	88	105	85	......	50	86	97	106	12	100	95
Schuylkill,	11	101	102	102	98	90	104	102	99	85	80	72	65	93	92	98	10	92	97
Snyder,	8	98	98	99	99	84	99	98	96	85	84	66	80	100	100	100	08	98	100
Somerset,	12	102	99	101	102	87	102	100	98	90	72	10	40	80	95	99	11	98	100
Sullivan,	8	104	97	96	98	75	108	94	86	95	86	70	68	97	98	98	10	92	97
Susquehanna,	11	103	102	88	92	65	113	95	95	110	92	64	70	105	106	108	11	91	103
Tioga,	10	97	99	84	85	65	108	88	80	103	90	......	75	100	100	102	12	93	98
Union,	8	102	100	97	96	82	102	90	75	70	75	75	70	95	101	97	09	96	101
Venango,	12	98	93	94	94	75	110	97	87	97	72	26	60	82	94	93	10	90	108
Warren,	10	95	92	85	88	68	106	90	90	90	75	65	75	75	98	100	12	97	98
Washington,	17	98	99	98	98	85	102	97	98	80	70	25	48	68	98	98	12	94	101
Wayne,	13	95	100	82	75	65	106	85	76	94	93	60	80	88	98	100	12	93	96
Westmoreland,	10	101	99	100	100	85	102	97	95	75	50	......	15	58	92	95	12	97	100
Wyoming,	5	105	100	84	80	65	112	75	70	94	86	50	65	98	105	110	11	100	105
York,	18	98	98	100	101	90	107	100	97	92	82	80	80	93	98	98	08	96	100
Total,	703	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Average,	......	100	100	95	96	81	106	97	90	88	75	55	66	87	97	97	90 10	94	100

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION OF CROPS AND LIVESTOCK, AUGUST 1, 1916.

The following report is compiled from the returns received from the official correspondents of the Department:

Wheat—Prospect compared with an average yield,	100 per cent.
Rye—Prospect compared with an average yield,	98 per cent.
Oats—Prospect compared with an average yield,	98 per cent.
Corn—Condition compared with an average,	91 per cent.
Buckwheat—Acreage sown compared with last year,	101 per cent.
Estimated acreage sown,	279,970
Condition compared with an average,	97 per cent.
Tobacco—Acreage planted compared with last year,	108 per cent.
Estimated area planted,	34,000 acres.
Condition compared with an average,	95 per cent.
Hay—Acreage harvested compared with last year,	106 per cent.
Estimated area harvested,	3,195,900 acres.
Average yield per acre,	1.64 tons.
Total yield approximately,	5,241,270 tons.
Potatoes—Condition compared with an average,	92 per cent.
Fruit—Prospect compared with a normal yield:	
Apple,	87 per cent.
Pear,	74 per cent.
Peach,	53 per cent.
Plum,	62 per cent.
Cherries—Average price per quart,	8 cents.
Raspberries—Average price per quart,	10 cents.
Blackberries—Average price per quart,	9 cents.
Turkeys—Number of young turkeys compared with average years,	81 per cent.

REVIEW OF CROP AND LIVESTOCK CONDITIONS, AUGUST 1, 1916.

The area seeded to wheat during the autumn of 1915 for this year's harvest was estimated at 1,338,000 acres. About one-third of one per cent. of this area was plowed down this spring, leaving 1,333,540 acres to be harvested. Harvest was from ten days to two weeks late due to the cool, wet weather that prevailed during the spring and early summer. Practically no damage was done by the Hessian fly.

Some damage has been done to the grain in the shock by the wet weather and some few reports say that the wheat was not as well filled as expected. However, reports on August first indicate that the approximate production will be 26,500,000 bushels. This is the same as was forecasted on July 1. The yield will surpass last year, and reports say that the quality of the grain is good except where it was injured in the shock by excessive moisture. Final figures on the production of wheat, rye and oats will be compiled on October first.

The prospect for yield of rye compared with an average at this time in the year is 98 per cent. and indicates that the yield will be about 4,655,000 bushels. The acreage harvested was two per cent. smaller than last year.

The condition of oats is three per cent. better than one month ago and now stands at 98 per cent. compared with 111 per cent. at this time last year. The total crop is estimated from present reports at 36,526,000 bushels as against 43,095,000 last year. The acreage is four per cent. smaller than last year.

The weather during July was very favorable for corn and the condition of this cereal now appears to be 91 per cent. compared with an average. This is an improvement of ten points over July first. The crop was retarded in some parts of the State due to late planting and unfavorable weather after planting; but should the weather continue favorable during August, the indications are that the yield will be above the average. The corn seems to be in the best condition in the south central part of the State where it is fully up to 100 per cent. In the northern tier counties where the corn is grown largely for ensilage, the condition is not good, being only about 81 per cent.

The area seeded to buckwheat is approximately 279,970 acres which is one per cent. larger than last year. Owing to wet weather many farmers could not sow as much oats or plant as much corn as they desired. It was their intention to put this ground in buckwheat too, but excessive moisture prevailed at the time for sowing buckwheat and prevented in many instances as large an acreage as was intended. Buckwheat was planted very late and is about three per cent. below an average.

The area of tobacco is estimated at 34,000 acres, which is eight per cent. larger than last year. The condition is 95 per cent. compared with an average. The indications are that the total crop will amount to 49,329,000 pounds. The crop is late, being delayed by the excessive moisture.

The area cut for hay is about six per cent. larger than last year. The estimated area is placed at 3,195,900 acres. The average production per acre is 1.64 tons and the total yield 5,241,270 tons. The total yield last year was 3,558,000 tons.

Potatoes show two per cent. improvement during the past month. The bugs have materially affected this crop this year and blight was reported in some sections.

See detailed report relative to prospect for fruit.

The number of young turkeys compared with average years is 81 per cent. The weather during this spring like last was entirely too cool and wet for the starting and advancement of turkeys.

The following information is furnished by Mr. George S. Bliss, Section Director, U. S. Department of Agriculture, Local Office of the Weather Bureau, Philadelphia:

WEATHER AND CROP SUMMARY FOR PENNSYLVANIA FOR JULY

"The month was characterized by periods of excessive heat with high humidity, and by a large number of severe local storms. No unusually high temperatures were recorded during the warm periods, but for much of the time the atmosphere was nearly saturated with moisture and the conditions were very oppressive. These conditions were favorable for the development of intense local storms, that, in some parts of the State, were the worst that have occurred in many years. The loss of life was not large, but the property damage in these storms was heavy. In Columbia County a cloudburst, on the 27th, washed out grades and bridges and caused landslides to such an extent that the loss on county roads and the railroads was estimated at upwards of $100,000, while the loss to crops was equally large. At Reading there occurred, on the 21st, the heaviest 24-hour rainfall on record for that place, and it was reported as being the most intense electrical storm that ever visited the city. Some other localities reporting heavy local storms are—Pittsburgh, New Castle, Carlisle, York, Stroudsburg and Mount Pocono. Excepting the losses by the above mentioned storms, the conditions were generally favorable for crop growth and development. Wheat was harvested without much loss, and was apparently an average crop. Corn improved rapidly to about a normal condition. Oats were good to excellent, and pastures and meadows were never better. Tobacco was mostly late, being delayed in the planting by the excessive moisture in the soil. Orchard fruits were fair, peaches and pears being light, and apples not quite up to the average. Early potatoes were good, while some blight was reported in the later varieties. Buckwheat was beginning to blossom at the close of the month, and was generally promising. Garden truck was about an average for yield and quality."

CROP AND LIVESTOCK REPORT

Report of the Pennsylvania Department of Agriculture on the Condition of Crops and Livestock, August 1, 1916.

Counties	Number reports filed	Wheat	Rye	Oats	Corn	Buckwheat		Hay		Potatoes — Condition compared with an average	Fruit—Prospect Compared With Normal Yield				Cherries—Average price per quart	Raspberries—Average price per quart	Blackberries—Average price per quart	Turkeys—Number of young turkeys compared with average years
		Prospect compared with an average yield	Prospect compared with an average yield	Condition compared with an average	Condition compared with an average	Acreage sown compared with 1915	Condition compared with an average	Acreage harvested compared with last year	Average production per acre		Apple	Pear	Peach	Plum				
		%	%	%	%	%	%	%	tons	%	%	%	%	%				%
Adams,	8	95	97	100	100	......	......	103	1.65	92	90	70	65	65	$0 07	$0 09	$0 07	75
Allegheny,	18	103	102	103	90	100	98	115	1.6	93	60	60	22	35	09	12	11	87
Armstrong,	8	106	100	102	87	95	85	104	1.5	92	85	50	18	25	08	11	09	75
Beaver,	10	100	100	100	92	96	93	108	1.72	90	84	60	35	40	09	11	10	75
Bedford,	12	102	101	104	99	102	99	106	1.72	88	90	70	60	72	06	09	08	80
Berks,	21	110	105	102	97	100	96	105	1.75	95	87	88	75	87	07	09	08	78
Blair,	7	100	96	100	90	104	95	106	1.72	90	90	86	40	86	09	09	09	80
Bradford,	13	104	102	97	85	92	95	107	1.5	95	97	86	75	76	08	11	10	82
Bucks,	12	100	98	103	93	102	101	104	1.7	97	85	84	75	70	08	10	09	82
Butler,	18	95	97	96	90	96	96	107	1.78	85	85	57	22	40	08	11	09	85
Cambria,	10	99	97	95	78	101	95	112	1.6	85	87	65	15	25	09	10	08	70
Cameron,	5	98	102	100	92	110	100	105	1.6	92	95	84	28	50	11	13	12	85
Carbon,	5	105	102	105	103	106	101	104	2.	101	95	95	90	80	09	11	08	80
Centre,	11	104	102	104	96	101	101	102	1.8	92	95	75	65	70	07	09	09	78
Chester,	19	98	99	100	96	100	97	106	1.56	93	72	74	70	70	09	11	10	83
Clarion,	12	104	100	95	88	96	95	118	1.88	88	92	65	42	50	09	11	08	75
Clearfield,	12	104	101	106	90	98	99	120	1.75	92	90	70	48	50	08	10	08	80
Clinton,	8	103	104	102	92	98	94	112	1.7	87	95	90	65	70	07	11	08	72
Columbia,	8	98	95	100	93	100	98	104	1.8	95	88	86	55	62	07	10	09	82
Crawford,	14	98	97	92	85	104	98	110	1.8	90	90	80	53	77	09	12	11	92
Cumberland,	13	100	100	99	98	97	97	104	1.6	98	85	85	78	80	07	08	07	84
Dauphin,	12	100	98	99	101	101	98	104	1.5	98	75	73	70	68	06	09	07	70
Delaware,	7	100	100	103	99	......	......	105	1.5	97	72	65	70	65	08	11	11	96
Elk,	5	99	103	92	85	94	94	114	1.7	80	100	50	......	......	10	12	......	......
Erie,	10	96	96	88	82	100	90	109	1.88	88	95	85	46	68	09	12	10	86
Fayette,	13	99	100	99	90	107	105	107	1.5	90	62	30	......	25	11	12	12	80
Forest,	7	102	97	90	85	104	96	110	1.85	95	105	......	......	......	10	11	08	85

CROP AND LIVESTOCK REPORT—Continued

Report of the Pennsylvania Department of Agriculture on the Condition of Crops and Livestock, August 1, 1916.

Counties	Number reports filed	Wheat	Rye	Oats	Corn	Buckwheat		Hay		Potatoes — Condition compared with an average	Fruit—Prospect Compared With Normal Yield				Cherries—Average price per quart	Raspberries—Average price per quart	Blackberries—Average price per quart	Turkeys—Number of young turkeys compared with average years
		Prospect compared with an average yield	Prospect compared with an average yield	Condition compared with an average	Condition compared with an average	Acreage sown compared with 1915	Condition compared with an average	Acreage harvested compared with last year	Average production per acre		Apple	Pear	Peach	Plum				
		%	%	%	%	%	%	%	tons	%	%	%	%	%				%
Franklin,	9	93	100	101	98	100	98	104	1.5	102	90	78	75	74	05	09	06	76
Fulton,	6	94	97	·103	95	100	100	108	1.4	95	87	70	72	80	05	08	07	90
Greene,	7	101	101	105	92	......	......	115	1.7	90	67	35	......	......	09	11	09	86
Huntingdon,	15	96	95	105	92	100	99	105	1.4	90	90	85	78	84	07	09	07	95
Indiana,	12	103	99	97	90	101	98	108	1.6	87	85	52	......	25	10	11	09	83
Jefferson,	10	100	100	87	86	94	92	110	1.52	85	85	40	20	25	09	10	07	......
Juniata,	8	93	94	95	90	98	95	105	1.45	86	86	65	60	70	06	08	06	78
Lackawanna,	8	95	100	96	82	101	94	109	1.6	75	78	60	20	50	10	13	10	76
Lancaster,	20	97	99	92	101	......	......	100	1.9	97	80	75	70	65	07	09	08	80
Lawrence,	10	95	95	96	90	106	98	110	1.85	83	92	72	52	72	08	12	10	82
Lebanon,	8	95	96	96	93	......	......	103	1.6	99	90	86	68	80	07	10	08	75
Lehigh,	12	98	98	103	96	105	104	102	1.56	98	86	85	82	78	09	11	10	78
Luzerne,	9	98	99	102	85	98	97	101	1.6	98	90	68	60	55	09	11	10	90
Lycoming,	16	98	99	98	94	106	97	104	1.75	93	85	83	70	72	08	10	08	80
McKean,	8	100	98	90	78	102	92	106	1.7	85	90	......	......	......	......	......	......	83
Mercer,	14	98	96	95	87	103	94	105	1.78	90	105	82	54	72	09	12	11	84
Mifflin,	9	94	94	100	88	96	86	107	1.8	84	90	66	50	60	06	09	07	74
Monroe,	11	102	102	98	88	103	100	108	1.57	93	88	70	65	70	09	11	09	82
Montgomery,	13	99	99	102	90	......	......	100	1.65	95	80	80	60	65	08	11	10	80
Montour,	5	95	95	103	92	102	97	103	1.7	88	82	78	70	58	08	10	09	70
Northampton,	9	102	99	93	98	105	100	103	1.57	88	75	80	75	70	09	10	09	80
Northumberland,	8	94	94	98	90	98	97	105	1.4	90	88	85	55	68	07	09	08	72
Perry,	10	95	92	100	97	99	101	100	1.57	92	75	80	78	84	06	08	07	84
Philadelphia,	5	93	95	98	100	......	......	102	2.	101	78	74	76	70	06	09	08	95
Pike,	6	95	96	101	87	105	98	100	1.25	94	86	85	57	60	10	11	10	......
Potter,	11	97	97	92	84	96	92	108	1.45	85	100	88	......	75	10	10	07	92
Schuylkill,	12	103	102	106	98	101	101	107	1.9	97	83	78	68	68	07	10	09	72

Snyder,	8	98	98	102	92	98	97	103	1.25	90	80	82	68	75	07	08	06	78
Somerset,	13	102	99	101	92	102	100	105	1.5	96	92	72	30	48	07	09	08	85
Sullivan,	7	104	98	100	90	105	100	108	1.8	95	96	87	60	77	06	10	08	70
Susquehanna,	13	103	100	93	82	101	98	112	1.78	92	106	86	60	68	09	11	10	78
Tioga,	10	95	94	90	85	102	95	108	1.6	90	105	94	......	76	10	11	10	84
Union,	9	101	96	98	93	99	92	100	1.44	92	68	68	77	52	06	08	07	80
Venango,	12	94	92	95	87	103	98	105	1.6	87	93	55	30	65	09	11	09	87
Warren,	10	97	94	86	75	106	98	105	1.76	85	80	72	50	72	10	12	08	90
Washington,	17	100	100	101	93	......	......	106	1.64	94	80	60	20	42	10	11	10	93
Wayne,	12	96	97	90	80	105	97	105	1.57	85	90	94	65	63	10	12	10	80
Westmoreland,	11	99	101	104	92	101	92	107	1.72	94	85	65	......	25	11	12	10	86
Wyoming,	5	106	101	98	88	108	98	107	1.25	93	87	84	45	60	09	10	09	65
York,	17	96	97	100	103	100	100	105	1.72	97	90	80	80	75	06	08	07	88
Total,	713	....	....	....	....	......	......	......	......	......	......	......	......	......	......	......	......	......
Average,	....	100	98	98	91	101	97	106	1.64	92	87	74	53	62	08	10	09	81

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION OF CROPS, ETC., OCTOBER 1, 1916.

The following report is compiled from the returns received from the official correspondents of the Department:

Wheat—Average production per acre,	18.8 bushels.
Quality compared with an average,	96 per cent.
Crop of 1915 still in producers' hands,	3 per cent.
Rye—Average production per acre,	16.9 bushels.
Oats—Average production per acre,	31 bushels.
Quality compared with an average,	92 per cent.
Corn—Prospect compared with an average yield,	85 per cent.
Buckwheat—Prospect compared with an average yield,	77 per cent.
Potatoes—Prospect compared with an average yield,	64 per cent.
Tobacco—Prospect compared with an average yield,	90 per cent.
Pasture—Condition compared with an average,	90 per cent.
Apples—Prospect compared with a normal yield,	78 per cent.
Peaches—Average price per basket,	89 cents.
Pears—Average price per bushel,	$1.00.
Plums—Average price per quart,	7 cents.

REVIEW OF CROP CONDITIONS, OCTOBER 1, 1916

This is the final estimate of the production of wheat for the year 1916, and shows a decline in production from our last forecast which was made on August first. Our estimate now places the production per acre at 18.8 bushels and the total production at 25,070,500 bushels. The total production is not as large as it was forecasted during the summer it would be, yet it is a large crop and practically the same yield as last year. The average production per acre in Pennsylvania during the last ten years has been 17.5 bushels. It will thus be seen that the crop this year is 1,733,600 bushels in excess of an average crop. The figures were collected after the threshing was largely done. The tabulation has been done carefully and conservatively and we have every reason to believe that the above is a reliable estimate. The quality of wheat, as well as the rye and oats, is a little below the average condition. This is largely due to the wet weather that prevailed at harvest time while much of the grain was standing in the field in shock. It was greatly feared at that time that the damage would be much greater than it appears at the present time. It seems that about three per cent. of the 1915 crop is still in the producers' hands. The price has been too attractive to permit much wheat being held.

The total yield of rye is estimated at 4,495,400 bushels. This is on the basis of 16.9 bushels per acre which is the ten-year average in this state. This is two per cent. better than forecasted on August first. The total production last year was 4,672,000 bushels. The acreage this year was about two per cent. smaller than last year.

The yield of oats per acre is estimated at 31 bushels which is about one and one-half per cent. better than an average crop. The total production this year is approximately 32,571,000 bushels as against 43,095,000 bushels. However, it must be remembered that last year there was one of the largest crops of oats ever produced in this state. It was about 12,000,000 bushels in excess of the year previous.

Corn shows a decline of six points since August first report. This is due to the drought which prevailed in many parts of the state during August and September. The corn appears to be the best in the south central part of the state where it is fully up to an average crop. Will make final estimate of the production of corn, buckwheat, potatoes and tobacco in our next report.

Weather conditions have not been favorable and the prospect for buckwheat has materially declined since our August first report. It now seems that there will only be about three-fourths of an average crop, or fifteen bushels per acre. On this basis, the total yield will be about 4,200,000 bushels.

The sesason has not been favorable for potatoes. The bugs, blight and the drought are responsible for the poor condition of the crop. Rot has injured the crop in some places too. The estimate is placed at the present time at about 54 bushels per acre. This seems small when it is remembered that the yield last year averaged 75 bushels per acre and the year previous 106 bushels per acre.

The condition of tobacco indicates that there will be about 90 per cent. of an average yield, or 1,200 pounds per acre.

The pasture is below the average due to drought in many parts of the state. This means that the livestock may not go into winter quarters in as good condition as a year ago.

Apples appear to be about four-fifths of a normal crop. The average price of peaches this year per basket was 89 cents; pears, per bushel, $1.00; and plums per quart, seven cents. The average price of peaches last year 45 cents; pears, 85 cents; and plums, five cents.

The following information is furnished by Mr. George S. Bliss, Section Director, U. S. Department of Agriculture, Local Office of the Weather Bureau, Philadelphia.

WEATHER AND CROP SUMMARY FOR SEPTEMBER, 1916

"The first two weeks were warm and moderately dry in most sections, but that condition was broken by heavy general rains on the 15th, and the remainder of the month was comparatively cool, so that on the whole the temperatures averaged slightly below and the rainfall slightly above the September normal. Farm work generally made good progress. It was most too dry for plowing during the early part of the month, but the weather was favorable for oats threshing, which was completed before the heavy rains began. The delay in plowing caused no inconvenience because most of the farmers purposely delayed their wheat seeding to avoid damage by the Hessian fly. The effects of the dry period were felt most in the tobacco districts, where the rains were deficient at the time when they were most needed. As a result the crop promised only about three-fourths of a normal yield although the quality was mostly good. A killing frost occurred in many western and northern counties on the 19th, and damaged fields of late corn. The corn crop as a whole was seemingly about an average one, and cutting was well advanced in the southern counties at the close of the month. Potatoes rotted in the ground to a greater extent than in former years, and in some places were nearly a failure."

NOTE—Our correspondents will please observe that under our present plan we do not collect a report for February first and September first.

CROP AND LIVESTOCK REPORT

Report of the Department of Agriculture on the Condition of Crops, Etc., October 1, 1916.

Counties	Number reports filed	Wheat			Rye	Oats		Corn	Buckwheat — Prospect compared with an average yield	Potatoes—Prospect compared with an average yield.	Tobacco—Prospect compared with an average yield	Pasture—Condition compared with an average	Apples—Prospect compared with a normal yield	Peaches—Average price per basket	Pears—Average price per bushel	Plums—Average price per quart
		Estimated average yield per acre	Quality compared with an average	Crop of 1915 still in producers' hands	Estimated average yield per acre	Estimated average yield per acre	Quality compared with an average	Prospect compared with an average yield								
		Bu.	%	%	Bu.	Bu.	%	%	%	%	%	%	%			
Adams, ...	8	17	95	4	16	34	90	100	....	70	....	105	80	$0 65	$0 62	$0 06
Allegheny, ...	16	20.4	100	5	18.5	34.4	90	85	95	55	....	95	50	1 15	1 25	08
Armstrong, ...	8	18.3	99	3	16	28.4	92	83	85	62	....	85	65	1 15	1 16	06
Beaver, ...	9	15.6	97	6	14	28.8	88	78	80	50	....	80	65	1 10	1 35	08
Bedford, ...	10	17.4	100	6	16.9	31.2	90	102	87	72	....	95	90	1 00	70	03
Berks, ...	19	24	100	....	21.2	38.2	96	95	84	70	98	85	75	85	78	07
Blair, ...	9	17.5	97	3	15.7	31.3	88	90	80	60	....	87	98	90	92	05
Bradford, ...	11	18.6	98	3	14.4	26.5	90	82	82	72	96	93	92	80	92	07
Bucks, ...	14	21.4	94	2	19.9	36.2	95	90	85	80	....	85	65	75	82	08
Butler, ...	17	16.3	96	6	15	30	92	80	82	56	....	82	76	1 00	1 35	07
Cambria, ...	10	16	94	2	15	29.4	92	82	78	68	....	94	88	....	1 16	09
Cameron, ...	4	18	90	....	20	29.5	90	68	74	45	....	75	88	....	90	....
Carbon, ...	5	20.2	92	....	16.4	31	97	82	74	75	....	72	87	90	90	09
Centre, ...	7	17.8	98	3	17	32.3	94	87	98	70	....	95	84	1 20	1 05	07
Chester, ...	21	22.7	97	5	21.5	39.1	94	95	....	65	....	75	55	90	92	09
Clarion, ...	9	18.4	100	....	15.2	29	90	78	84	58	....	87	88	1 30	1 30	07
Clearfield, ...	9	18	96	6	16.6	31.6	95	83	70	58	....	83	92	....	1 25	10
Clinton, ...	6	19.4	95	....	17.7	31.6	97	60	65	55	80	82	93	1 08	1 25	06
Columbia, ...	9	16.6	94	4	13.6	29.4	90	80	63	68	....	83	75	83	90	05
Crawford, ...	14	17.6	98	3	14.8	29	96	80	78	62	....	94	80	92	1 05	05
Cumberland, ...	12	18.8	101	4	19.5	35	92	98	....	72	....	98	85	68	78	05
Dauphin, ...	12	18.6	100	4	17.6	32.9	95	97	86	64	....	97	65	83	94	07
Delaware, ...	6	22.5	87	2	18.7	42	90	95	....	75	....	78	68	80	1 00	08
Elk, ...	5	20.8	95	6	22.4	32	92	75	65	35	....	78	93	....	1 10	08
Erie, ...	10	17	97	6	16.2	29	88	80	85	35	....	90	83	75	1 10	07
Fayette, ...	12	17	95	5	18.3	29.8	90	85	....	55	....	105	40	....	....	....

Forest,	5	18.4	98	....	13.4	34.5	94	80	78	63	....	94	98	....	....	....
Franklin,	9	17	96	4	16.6	32.5	97	103	94	80	....	100	88	70	85	04
Fulton,	8	14	94	3	12.3	26.5	97	103	88	75	....	102	80	65	88	03
Greene,	9	16	101	9	15.8	29.4	98	75	90	74	....	97	56	....	....	....
Huntingdon,	15	15.7	95	6	13.3	27.8	95	93	86	70	....	100	87	96	96	05
Indiana,	12	16.8	100	4	14.5	27.5	90	83	87	65	....	97	88	95	1 20	08
Jefferson,	10	17.5	100	4	15	28.7	90	88	70	68	....	87	84	....	....	....
Juniata,	7	15.5	93	1	14.5	28	90	80	80	65	....	80	65	70	1 00	06
Lackawanna,	8	16.7	100	....	17	32.7	87	74	74	52	....	85	73	90	1 05	06
Lancaster,	21	22.9	98	5	22.4	34.5	93	106	....	75	90	95	72	90	92	08
Lawrence,	10	17.3	100	10	16.5	32.4	96	78	88	40	....	78	86	1 00	1 40	....
Lebanon,	9	23.5	96	2	21.3	31	90	90	....	65	87	93	75	80	85	07
Lehigh,	11	21.7	92	2	19.7	34.2	95	83	85	75	....	80	84	82	80	09
Luzerne,	9	21.8	95	....	16	33.3	94	80	72	70	....	82	92	80	1 35	07
Lycoming,	15	18.4	93	4	15.8	31	90	82	70	68	....	84	74	83	1 05	06
McKean,	6	....	....	....	....	26	90	74	74	60	....	97	83	....	....	....
Mercer,	11	17	97	6	17.8	29.8	93	78	92	58	....	90	105	97	1 16	05
Mifflin,	8	17	94	3	16.3	32.2	93	90	80	48	....	90	72	97	90	05
Monroe,	10	19.8	94	1	17.3	30	92	72	58	66	....	84	80	1 00	1 05	07
Montgomery,	12	22.4	97	1	21.2	35.6	94	90	93	76	....	84	76	76	1 00	08
Montour,	5	16.4	92	3	12.6	31	95	83	65	45	....	92	72	80	1 00	04
Northampton,	9	23	97	2	19	35	90	95	85	78	....	95	78	80	90	09
Northumberland,	9	18.9	98	3	16.5	33	95	83	88	63	....	93	86	82	1 05	07
Perry,	9	15.9	100	4	14.3	30	96	90	74	56	....	90	45	85	75	05
Philadelphia,	6	24	90	....	20.0	41	100	100	....	92	....	80	70	66	1 07	08
Pike,	6	20	94	....	16	29	88	83	60	68	....	82	86	....	....	....
Potter,	11	....	....	....	17	25.4	92	72	50	58	....	84	90	....	....	....
Schuylkill,	8	22	90	6	19.6	33	94	88	50	62	....	80	74	84	1 12	08
Snyder,	8	17.8	100	5	17	34	93	90	83	64	95	92	60	78	87	05
Somerset,	10	19.9	100	2	18.6	31.3	95	93	87	78	....	104	97	....	....	....
Sullivan,	7	19.5	98	....	17	28.8	88	84	62	76	....	92	92	83	92	06
Susquehanna,	12	21.6	101	....	16	28.6	85	92	84	50	....	105	106	93	88	06
Tioga,	9	18.6	92	4	15.8	24.7	85	70	48	52	85	84	92	85	1 00	06
Union,	8	18.8	100	5	15.6	31.5	86	80	72	60	....	75	68	84	75	04
Venango,	11	15.5	94	8	15.2	27.6	85	75	80	52	....	90	80	1 10	1 20	06
Warren,	8	16.6	92	....	15.4	27	90	50	40	40	....	68	60	1 10	1 05	08
Washington,	13	17.5	101	5	16	30.4	90	80	....	60	....	88	72	....	....	....
Wayne,	11	....	....	....	18.6	27.8	83	65	58	66	....	96	80	1 00	1 00	07
Westmoreland,	8	19.4	95	....	17	31.2	92	82	80	60	....	87	54	....	....	....
Wyoming,	5	18.7	100	....	13.5	24.4	85	80	66	60	....	84	80	92	96	05
York,	16	19	97	4	18.2	39	94	110	90	60	92	100	88	72	80	07
Total,	666	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Average,	....	18.9	97	3	16.9	31	92	85	77	64	90	90	78	$0 89	$1 00	$0 07

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION OF CROPS, ETC., NOVEMBER 1, 1916.

The following report is compiled from the returns received from the official correspondents of the Department:

Wheat—Area sown this fall compared with last year,	103 per cent.
Estimated area seeded for 1917 harvest,	1,373,500 acres.
Condition of wheat in the ground compared with an average,	98 per cent.
Rye—Area sown this fall compared with last year,	99 per cent.
Estimated area seeded for 1917 harvest,	263,340 acres
Condition of rye in the ground compared with an average,	99 per cent.
Corn—Average yield per acre (shelled),	37 bushels.
Buckwheat—Average yield per acre,	16 bushels.
Potatoes—Average yield per acre,	70 bushels.
Tobacco—Average production per acre,	1340 pounds.
Apples—Number of bushels produced compared with last year,	111 per cent.
Average price per bushel,	68 cents.
Alfalfa—Acreage harvested compared with last year,	103 per cent.
Average number of cuttings,	3
Average production per acre from all cuttings,	2.9 tons.
Cloverseed—Prospect compared with an average yield,	90 per cent.
Hogs—Condition compared with an average,	100 per cent.
Number being fattened compared with an average,	96 per cent.
Silos—Farmers using silos,	10½ per cent
Farm Tractors—Estimated number in use in Pennsylvania,	540
Eggs—Estimated average number of dozen produced on each farm,	348

REVIEW OF CROP CONDITIONS, NOVEMBER 1, 1916

Reports from seven hundred and four correspondents indicate that the area seeded to wheat is approximately three per cent. larger than last year. The three per cent. increases the area 40,000 acres and fixes the total area seeded for the 1917 harvest at 1,373,500 acres. The wheat was sown late this fall in order to avoid the ravages of the Hessian fly. Then, in many parts of the State a drought prevailed at seeding time and this made it necessary to wait for more favorable conditions. The condition of the wheat in the ground for this season of the year stands at 98 per cent. Weather conditions are favorable and indicate that the grain will get a good start before the ground freezes. The large increase in acreage is due to the good prices prevailing during the fall.

The estimated area seeded to rye is 263,340 acres which is one per cent. smaller than the area seeded one year ago. The condition of the rye in the ground is slightly below the average at this season of the year.

The estimated area of corn harvested is 1,461,120 acres. The yield per acre is fixed at 37 bushels and the total yield 54,061,400 bushels. Wet weather injured the crop in many parts of the State, materially damaging it on low ground, and preventing the necessary cultivation. Conditions were very unfavorable for the corn up to July first. After this time it made a splendid growth and would have been a bumper crop if it had not been for the drought during August and September.

The production of buckwheat is estimated at 16 bushels per acre which is about four-fifths of an average crop. The total production is approximately 4,480,000 bushels. The season was not a good one for buckwheat. Conditions were unfavorable at seeding time and then the drought, and hot sun when the grain was in bloom had their damaging effect.

The yield of potatoes is estimated at 70 bushels per acre and the total yield 18,564,000 bushels. The average yield per acre two years ago was 106 bushels and one year ago 75 bushels. The yield this year is only about 83 per cent. of the ten-year average but is still much better than forecasted during the early fall.

Tobacco is a little better than an average crop. The average production appears to be 1,340 pounds per acre and the total production 45,560,000 pounds. The acreage is eight per cent. larger than last year.

Reports indicate that the production of apples excels that of last year by about eleven per cent. From this we estimate that the total yield this year is 5,644,000 barrels of three bushels each.

The total production of peaches was about 1,083,000 bushels which is 53 per cent. of the last year's crop.

Alfalfa shows about three per cent. larger acreage harvested than last year. The average yield from all cuttings was 2.9 tons per acre. From the best information available, we have estimated the area harvested at 47,800 acres and the total production at 138,600 tons.

The condition of hogs stands at 100 per cent. while the number being fattened compared with other years is 96 per cent.

It appears that ten and one-half per cent. of the farmers are now using silos against nine per cent. one year ago. This means an increase of 3,500 during the year and fixes the whole number in use at 23,000.

Seven hundred and four townships report 250 farm tractors in use. On this basis the whole number in use in this State is approximately 540.

It appears from a conservative estimate that each farm in the State on an average produces annually 348 dozen eggs. On this basis the whole number produced is approximately 76,315,000 dozen.

CROP AND LIVESTOCK REPORT

Report of the Department of Agriculture on the Condition of Crops, Etc., November 1, 1916

Counties	Number reports filed	Wheat		Rye		Corn—Average yield per acre (shelled)	Buckwheat—Average yield per acre	Potatoes—Average yield per acre	Tobacco—Average production per acre	Apples		Alfalfa		Cloverseed — Prospect compared with an average yield	Hogs		Silos—Percentage of farmers using silos	Number of farm tractors used	Eggs—Estimated average number of dozen produced annually on each farm
		Acreage sown this fall compared with last year	Condition of wheat in ground compared with an average	Acreage sown this fall compared with last year	Condition of rye in ground compared with an average					Number of bushels produced compared with last year	Average price per bushel	Acres harvested compared with last year	Average production per acre from all cuttings		Condition compared with an average	Number to be fattened compared with an average			
		%	%	%	%	Bu.	Bu.	Bu.	Lbs.	%		%	Tons.	%	%	%	%		
Adams,	9	104	102	96	98	51	......	92	......	98	$0 65	102	2.8	80	95	95	5	......	558
Allegheny,	19	103	95	97	95	38	17	56	......	65	1 16	104	3.2	......	97	94	9	2	397
Armstrong,	9	101	95	98	97	32	15	75	......	80	75	105	2.7	90	98	94	2	4	336
Beaver,	10	101	90	98	94	30	13	38	......	75	98	97	2.7	94	100	94	5	......	252
Bedford,	11	106	98	90	98	45	20	87	......	110	45	100	2.8	88	102	100	8	1	348
Berks,	20	102	96	98	97	51	22	88	......	90	78	101	3.	76	102	98	3	7	600
Blair,	8	102	97	99	97	37	15	52	......	110	50	100	3.	100	98	100	7	1	275
Bradford,	13	109	103	97	102	32	17	83	......	115	56	101	2.8	......	102	94	40	1	384
Bucks,	12	102	99	100	101	48	25	90	......	80	85	102	3.6	80	100	98	12	5	462
Butler,	18	101	96	97	96	31	15	55	......	115	80	108	2.9	150	102	97	16	9	576
Cambria,	10	104	92	96	94	28	16	85	......	210	60	110	3.4	......	98	98	7	1	298
Cameron,	5	95	100	100	100	30	17	45	......	150	63	100	2.8	......	98	97	6	......	215
Carbon,	5	104	100	100	98	24	14	67	......	100	80	108	2.	......	101	100	2	4	351
Centre,	9	102	99	98	100	36	20	55	......	125	48	97	3.3	115	99	98	8	2	343
Chester,	22	108	98	97	99	57	......	75	1,325	50	95	115	3.5	100	98	85	18	12	385
Clarion,	11	108	95	97	94	32	16	63	......	150	52	96	2.5	105	100	97	6	2	292
Clearfield,	10	104	100	100	99	32	12	54	......	150	53	107	3.	90	102	103	8	1	335
Clinton,	9	99	98	98	100	33	13	52	......	120	50	98	2.3	110	94	92	8	2	240
Columbia,	9	100	98	102	97	32	14	63	......	100	57	105	2.5	85	96	97	5	1	292
Crawford,	14	108	102	101	100	33	14	55	......	150	48	102	3.2	108	102	98	20	2	257
Cumberland,	14	103	100	98	102	48	......	85	......	95	65	100	3.3	90	100	95	6	7	440
Dauphin,	12	104	101	96	99	49	22	78	......	80	78	103	3.8	68	96	90	5	......	425
Delaware,	5	101	102	104	102	50	......	84	......	75	1 08	110	3.3	......	100	102	18	1	409
Elk,	6	110	96	95	98	27	17	53	......	300	70	97	3.5	......	100	98	12	......	306
Erie,	11	106	104	97	102	35	17	70	......	125	87	102	2.8	97	94	90	24	9	20[illegible]
Fayette,	12	102	102	97	102	35	18	75	......	60	95	100	3.	97	106	97	4	1	278

Forest,	7	100	100	99	98	36	13	40	......	125	57	100	3.	100	99	102	3	......	210
Franklin,	9	108	98	98	100	50	13	100	......	125	55	105	2.8	90	97	88	4	2	158
Fulton,	8	105	97	101	98	38	14	85	......	90	40	105	2.3	110	100	97	2	1	390
Greene,	7	100	105	108	110	32	17	65	......	85	87	110	2.3	......	101	94	3	4	254
Huntingdon,	15	101	99	99	98	36	13	74	......	105	52	100	2.5	85	100	99	3	5	376
Indiana,	12	107	98	101	101	32	15	57	......	110	65	105	2.9	115	98	96	6	6	350
Jefferson,	9	105	97	98	95	30	15	54	......	125	50	98	2.3	100	98	96	5	3	245
Juniata,	7	105	100	98	100	35	19	52	1,330	75	66	110	3.	65	97	95	3	2	503
Lackawanna,	8	100	100	105	99	32	16	65	......	125	65	95	3.5	80	97	98	13	......	275
Lancaster,	21	108	99	98	99	65	......	87	1,335	85	1.03	102	3.5	100	98	95	12	19	480
Lawrence,	10	99	96	98	98	35	15	88	......	100	65	107	2.8	120	100	96	16	5	288
Lebanon,	8	103	98	97	97	48	......	82	1,400	75	1 00	105	3.2	......	98	96	10	9	442
Lehigh,	12	103	97	98	98	40	22	95	......	80	88	106	3 2	98	100	100	4	15	444
Luzerne,	8	103	98	97	99	35	16	90	......	125	62	100	3.	......	99	100	4	1	244
Lycoming,	18	102	99	99	98	37	14	75	......	90	62	100	2.5	100	100	97	5	11	325
McKean,	7	96	95	94	96	35	12	62	......	300	50	100	2.5	......	95	90	20	......	208
Mercer,	14	102	98	98	98	30	17	60	......	200	52	100	2.5	140	100	97	25	1	298
Mifflin,	9	103	98	97	97	35	18	46	......	85	70	105	3.	97	95	90	7	3	406
Monroe,	11	102	98	99	97	28	15	65	......	100	57	108	2.8	95	96	98	5	6	375
Montgomery,	13	101	97	99	97	54	22	75	......	75	1 00	102	2.3	90	98	96	10	16	495
Montour,	4	105	100	100	97	31	12	62	......	105	58	100	2.8	83	94	90	5	3	360
Northampton,	9	100	95	100	98	45	22	108	......	75	70	100	2.5	65	100	95	8	1	400
Northumberland,	9	99	98	99	98	35	18	60	......	90	50	100	2.3	84	97	94	5	4	395
Perry,	10	104	102	98	100	40	18	58	......	70	80	90	2.5	55	100	90	3	1	518
Philadelphia,	6	102	98	100	99	55	......	125	......	65	98	104	3.5	......	100	104	3	12	270
Pike,	6	110	104	101	102	35	12	115	......	110	62	105	2.	100	100	96	6	1	260
Potter,	10	100	100	100	100	30	9	60	......	100	45	100	2.	90	98	98	12	1	232
Schuylkill,	8	100	100	100	99	44	15	81	......	90	83	105	2.8	50	98	95	7	1	230
Snyder,	8	102	101	99	100	37	18	58	......	70	55	100	3.	68	100	95	2	......	475
Somerset,	12	102	98	98	100	39	18	74	......	150	45	108	2.8	90	100	100	16	5	280
Sullivan,	7	105	100	97	98	40	11	86	......	125	45	100	3.5	......	99	92	11	......	305
Susquehanna,	12	102	101	100	101	33	14	95	......	175	40	104	3.2	92	100	94	40	7	323
Tioga,	10	125	98	98	95	28	13	68	......	150	40	104	3.5	......	99	97	48	2	288
Union,	9	102	99	98	97	37	15	60	......	50	62	97	2.5	70	98	93	7	3	465
Venango,	10	102	97	98	100	29	14	60	......	150	65	107	2.9	97	97	98	4	2	285
Warren,	8	103	94	99	98	16	7	44	......	135	75	100	3.	102	99	95	37	......	223
Washington,	17	102	95	98	97	35	......	56	......	70	1 03	106	2.6	108	98	99	13	3	335
Wayne,	12	101	95	99	98	27	15	80	......	95	50	100	2.5	......	102	100	27	1	265
Westmoreland,	10	103	97	97	96	37	18	56	......	50	1 00	110	3.4	90	99	100	7	9	220
Wyoming,	5	100	100	100	103	27	17	90	......	100	50	100	2.5	......	100	97	28	1	265
York,	16	107	100	99	98	60	15	95	1,325	90	87	100	2.8	94	98	98	8	8	506
Total,	704	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	250	......
Average,	......	103	98	99	99	37	16	70	1,340	111	0 68	108	2.9	90	100	96	10½	......	348

REPORT OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE ON THE CONDITION AND VALUE OF CROPS, ETC., DECEMBER 1, 1916.

The following report is compiled from the returns received from the official correspondents of the Department:

CEREALS

Wheat—Estimated area harvested, 1916,	1,333,540	acres.
Average yield per acre,	18.8	bushels.
Total estimated production,	25,070,500	bushels.
Average price per bushel,	$1.46	
Total estimated value of crop,	$36,602,930.00	
Corn—Estimated area harvested,	1,461,120	acres.
Average yield per acre (shelled),	37	bushels.
Total established production,	54,061,400	bushels.
Average price per bushel,	$0.92	
Total estimated value of crop,	$49,736,488.00	
Rye—Estimated area harvested,	266,000	acres.
Average yield per acre,	16.9	bushels.
Total estimated production,	4,495,400	bushels.
Average price per bushel,	$1.04	
Total estimated value of crop,	$4,675,216.00	
Oats—Estimated area harvested,	1,050,680	acres.
Average yield per acre,	31	bushels.
Total estimated production,	32,571,000	bushels.
Average price per bushel,	$0.55	
Total estimated value of crop,	$17,914,050.00	
Buckwheat—Estimated area harvested,	265,200	acres.
Average yield per acre,	16	bushels.
Total estimated production,	4,480,000	bushels.
Average price per bushel,	$1.04	
Total estimated value of crop,	$4,659,200.00	

POTATOES

Potatoes—Estimated area harvested,	265,200	acres.
Average yield per acre,	70	bushels.
Total estimated production,	18,564,000	bushels.
Average price per bushel,	$1.30	
Total estimated value of crop,	$24,133,200.00	

TOBACCO

Tobacco—Estimated area harvested,	34,000	acres.
Average yield per acre,	1,340	pounds.
Total estimated production,	45,560,000	pounds.
Average price per pound,	$0.15	pounds.
Total estimated value of crop,	$6,834,000.00	pounds.

HAY

Hay—Estimated area harvested,	3,195,900	acres.
Average yield per acre,	1.64	tons.
Total estimated production,	5,241,270	tons.
Average price per ton,	$14.50	
Total estimated value of crop,	$75,998,415.00	

PRODUCE

Wool—Number of fleeces clipped,	630,500	
Average weight per fleece,	6.3	pounds.
Total estimated weight of clip,	3,972,150	pounds.
Average price per pound,	$0.34	
Total estimated value of clip,	$1,350,531.00	
Eggs—Estimated number of dozen produced on farms in State,	76,315,000	
Average price per dozen,	$0.33	
Total estimated value of production,	$25,183,950.00	
Butter—Average price per pound,	$0.34	
Milk—Wholesale, average price per 100 pounds,	1.95	
Retail, average price per quart,	.07	
Honey—Average price per pound,	.18	

POULTRY

Chickens—Live, average price per pound,	$0.16
Ducks—Live, average price per pound,	.16
Geese—Live, average price per pound,	.17
Turkeys—Live, average price per pound,	.26

FRUIT

Apples—Estimated number of bushels produced,	16,932,000
Average price per bushel,	$0.68
Total estimated value of crop,	$11,513,760.00
Peaches—Estimated number of baskets produced,	2,166,000
Average price per basket,	$0.89
Total estimated value of crop,	$1,927,740.00
Pears—Estimated number of bushels produced,	494,000
Average price per bushel,	$1.00
Total estimated value of crop,	$494,000.00
Plums—Average price per quart,	$0.07
Cherries—Average price per quart,	.08
Strawberries—Average price per quart,	.10
Raspberries—Average price per quart,	.10
Blackberries—Average price per quart,	.09

FARM LAND AND WAGES

Farm land—Average, value per acre,	$59.00
Farm wages—Average, by year, with board,	270.00
Farm wages—Average, for summer months only,	27.50
Farm wages—Average, by day, with board,	1.42
Farm wages—Harvest, by day,	1.89
Household help—Female, with board, per week,	3.42

WINTER GRAIN

Wheat—Condition compared with other years,	98 per cent.
Rye—Condition compared with other years,	97 per cent.

REVIEW OF CONDITION AND VALUE OF CROPS, ETC., FOR THE YEAR 1916.

The season of 1916 has been a most prosperous one from the standpoint of production and for prices received for farm products. The reports gathered throughout the year show that the wheat, rye, and hay crops were above those of a year ago while there was a slight decrease in the yield of corn and a decided slump in the oats crop. The 1916 valuation of these five major farm crops have an estimated value of $184,927,099.00 while the crops of 1915 were valued at $148,183,420.

With the exception of corn and hay the average production per acre was below the mark of last year but the average price of every crop was far in advance of the figures last year. The average price of wheat was $1.46 a bushel as compared with $1.05 last year and the corn average was 92 cents a bushel as compared with 76 cents last year. Rye sold this year at an average of $1.04 a bushel to 85 cents last year and oats at 55 cents a bushel to 46 cents last year. The bumper crop of hay has brought an average price of $14.50 a ton while the short crop of 1915 brought an average price of $15.90 a ton.

The buckwheat crop was a small one but the average price obtained brought the value of the crop above last year's figures. Potatoes showed a falling off of about two million bushels but the average price per bushel was fifty cents above last year and made the total value of the State crop almost eight million dollars more than last year. Although tobacco did not show as large an average yield per acre as last year the demand for foreign shipment brought splendid prices to the growers and made the total value of the crop over two million dollars more than last year.

The apple crop was a large one and brought much better prices than a year ago while the peach crop, representing about 53 per cent. of an average yield brought prices that made it almost worth in total value the bumper crop of a year ago.

While the prices of produce have shown a marked advance, the farmer has also been compelled to pay large increases for his labor, both male and female. The average farm wage by the year with board has increased from $235.00 to $270.00 and the average summer monthly pay has increased from $25.00 to $27.50. Farm wages by the day with board have increased from $1.20 to $1.42, and harvest hands cost on an average about ten cents more a day than last year. The cost of female household help by the week has increased from $3.20 to $3.42.

The year was not altogether a favorable one for successful farming as the heavy rains of the early spring interferred with the planting of corn. oats, buckwheat and potatoes and the drought of August and September curtailed the crops in a great measure. The present condition of the wheat in the ground is 98 per cent. and of rye 97 per cent. showing exactly the same average condition of the growing possibilities of these two grains as a year ago at this time.

CROP AND LIVESTOCK REPORT

Report of the Pennsylvania Department of Agriculture on the Condition and Value of Crops, etc., December 1, 1916

Counties	Number reports filed	Cereals					Potatoes—Average price per bushel	Hay—Average price per ton	Butter—Average price per pound	Milk		Eggs—Average price per dozen	Honey—Average price per pound
		Wheat — Average price per bushel	Corn—Average price per bushel	Rye—Average price per bushel	Oats—Average price per bushel	Buckwheat—Average price per bushel				Wholesale, average price per 100 pounds	Retail, average price per quart		
Adams,	10	$1 45	$0 80	$0 85	$0 48	....	$1 05	$13 50	$0 27	$1 60	$0 07	$0 25	$0 19
Allegheny,	17	1 49	1 04	1 15	59	1 13	1 50	15 50	42	1 96	09	40	23
Armstrong,	8	1 48	1 05	1 10	56	1 12	1 40	13 40	35	1 60	08	36	19
Beaver,	8	1 45	98	1 02	57	1 03	1 50	14 50	38	2 00	09	37	22
Bedford,	12	1 42	90	1 02	54	1 06	1 25	14 00	30	2 00	06	31	17
Berks,	21	1 50	92	1 03	52	1 02	1 35	16 50	40	1 85	07	37	20
Blair,	8	1 50	91	98	53	1 00	1 40	15 00	36	2 10	08	37	20
Bradford,	12	1 48	1 03	1 04	58	1 20	1 35	11 50	35	2 00	07	37	12
Bucks,	12	1 47	1 04	1 10	57	1 05	1 35	13 50	40	1 95	06	38	18
Butler,	17	1 45	1 00	1 02	58	1 05	1 45	11 50	35	2 10	07	34	20
Cambria,	10	1 45	1 06	1 05	60	1 02	1 43	16 45	36	2 25	08	37	18
Cameron,	4	1 50	1 10	1 10	62	1 15	1 50	15 25	38	....	08	38	16
Carbon,	3	1 35	1 10	1 08	63	98	1 30	19 00	39	2 10	08	39	18
Centre,	10	1 43	87	98	61	1 00	1 22	14 70	33	1 75	07	32	17
Chester,	20	1 44	86	1 06	55	....	1 25	15 00	40	2 06	07	40	19
Clarion,	12	1 40	1 05	1 10	57	1 05	1 27	11 50	31	1 88	07	30	19
Clearfield,	10	1 40	1 06	1 05	62	1 02	1 35	15 50	35	2 15	08	34	16
Clinton,	8	1 47	1 04	1 02	59	1 00	1 40	16 00	35	1 95	07	35	20
Columbia,	8	1 42	95	96	54	1 10	1 20	15 75	35	1 70	07	32	16
Crawford,	13	1 40	93	1 05	54	1 08	1 26	8 75	33	1 82	06	30	16
Cumberland,	14	1 45	82	98	47	1 03	1 17	16 50	34	1 78	06	34	18
Dauphin,	12	1 45	83	90	51	95	1 15	16 50	33	....	07	32	22
Delaware,	6	1 45	96	1 06	57	....	1 28	18 00	40	1 90	08	35	21
Elk,	6	1 52	1 06	1 08	60	1 12	1 40	15 80	34	2 25	08	34	18
Erie,	10	1 25	1 00	1 00	55	1 05	1 28	8 90	34	1 96	07	34	19

CROP AND LIVESTOCK REPORT—Continued

Report of the Pennsylvania Department of Agriculture on the Condition and Value of Crops, Etc., December 1, 1916

Counties	Number reports filed	Cereals					Potatoes—Average price per bushel	Hay—Average price per ton	Butter—Average price per pound	Milk		Eggs—Average price per dozen	Honey—Average price per pound
		Wheat — Average price per bushel	Corn—Average price per bushel	Rye—Average price per bushel	Oats—Average price per bushel	Buckwheat—Average price per bushel				Wholesale, average price per 100 pounds	Retail, average price per quart		
Fayette,	12	1 38	1 00	1 06	55	95	1 27	16 00	35	....	09	34	19
Forest,	7	1 38	1 00	1 10	58	1 08	1 36	13 00	29	....	07	29	17
Franklin,	10	1 43	87	1 00	51	1 20	1 20	14 20	28	1 75	06	27	14
Fulton,	7	1 35	80	1 00	56	1 00	1 20	12 00	25	....	06	25	14
Greene,	7	1 35	95	95	54	95	1 17	15 00	26	....	06	26	21
Huntingdon,	13	1 47	96	97	53	95	1 27	15 50	31	....	07	30	20
Indiana,	11	1 42	1 03	1 08	54	1 06	1 28	12 80	32	....	07	32	19
Jefferson,	11	1 38	99	97	54	1 08	1 25	11 50	30	....	07	28	16
Juniata,	7	1 50	80	1 05	44	1 07	1 25	13 75	31	1 80	06	30	17
Lackawanna,	7	1 60	1 05	1 10	65	1 09	1 28	16 00	36	2 20	08	35	16
Lancaster,	20	1 43	92	1 00	56	....	1 20	15 80	35	1 80	06	34	20
Lawrence,	10	1 65	1 00	1 06	56	1 05	1 50	12 80	37	1 80	08	35	21
Lebanon,	8	1 44	94	95	52	....	1 15	17 50	36	1 75	07	33	23
Lehigh,	12	1 47	98	1 10	56	96	1 30	17 00	36	1 90	07	34	17
Luzerne,	9	1 46	91	1 04	58	1 04	1 40	18 50	36	2 25	08	35	16
Lycoming,	17	1 46	90	1 02	54	1 02	1 18	13 90	34	1 90	07	32	14
McKean,	6	1 54	94	1 10	60	1 08	1 47	13 30	35	2 00	07	37	17
Mercer,	13	1 44	93	1 05	55	95	1 25	11 20	30	1 75	08	31	19
Mifflin,	9	1 46	83	1 01	45	1 01	1 28	16 00	31	1 80	07	31	17
Monroe,	12	1 42	1 03	1 12	58	1 00	1 30	15 70	35	2 15	07	37	16
Montgomery,	13	1 50	1 05	1 12	60	....	1 44	14 50	42	1 90	07	40	21
Montour,	5	1 52	87	1 15	50	1 14	1 30	15 80	34	1 90	07	35	14
Northampton,	8	1 40	86	1 02	52	94	1 22	18 50	35	2 00	07	37	18
Northumberland,	8	1 47	94	1 02	50	88	1 25	17 00	33	2 05	08	34	17
Perry,	10	1 52	76	85	44	87	1 20	13 75	30	....	06	32	17

Philadelphia,	6	1 52	1 06	1 13	59	....	1 50	18 00	42	....	09	40	25
Pike,	4	1 55	1 05	1 13	62	1 06	1 29	16 00	53	....	07	37	15
Potter,	10	1 53	93	1 06	59	1 06	1 28	11 40	33	2 00	06	33	15
Schuylkill,	9	1 46	1 04	1 06	58	1 00	1 26	18 00	38	2 20	08	38	21
Snyder,	8	1 39	80	96	42	94	1 06	14 60	30	1 70	06	27	15
Somerset,	13	1 42	1 00	1 06	56	1 02	1 26	13 50	31	2 10	07	30	20
Sullivan,	7	1 55	95	1 14	58	1 16	1 30	12 50	33	....	05	31	12
Susquehanna,	12	1 53	1 15	1 26	62	1 12	1 30	12 50	35	2 00	06	33	15
Tioga,	9	1 50	1 06	1 14	60	1 05	1 30	11 20	34	2 00	06	30	12
Union,	8	1 41	75	90	44	1 00	1 08	15 50	31	1 85	07	30	19
Venango,	10	1 48	1 00	1 05	56	1 00	1 35	11 30	31	2 25	08	30	18
Warren,	7	1 56	1 00	1 15	60	1 20	1 50	11 40	33	2 20	07	32	17
Washington,	16	1 40	98	1 03	55	....	1 35	12 50	31	2 30	08	30	23
Wayne,	11	....	98	1 05	61	1 12	1 30	12 80	34	1 95	06	35	15
Westmoreland,	11	1 50	1 02	1 10	56	1 00	1 50	15 00	38	2 20	09	37	23
Wyoming,	5	1 46	1 00	1 02	61	1 16	1 36	15 00	32	1 75	06	31	14
York,	16	1 45	85	88	50	90	1 16	15 30	33	1 80	06	32	20
Total,	685	....	....	....	....	....	....	....	....	....	....	....	....
Average,	....	$1 46	$0 92	$1 04	$0 55	$1 04	$1 30	$14 50	$0 34	$1 95	$0 07	$0 33	$0 18

CROP AND LIVESTOCK REPORT

Report of the Pennsylvania Department of Agriculture on the Condition and Value of Crops, Etc., December 1, 1916.

Counties	Wool—Unwashed, average price per pound	Poultry				Farm Land—Average value per acre	Farm Wages					Winter Grain	
		Chickens—Live, average price per pound	Ducks—Live, average price per pound	Geese—Live, average price per pound	Turkeys—Live, average price per pound		Average, by year, with board	Average, for summer months only	By day, with board, average	Harvest, by day, average	Female, household, by week, with board	Wheat—Condition of grain in ground compared with other years	Rye—Condition of grain in ground compared with other years
												%	%
Adams,	$0 31	$0 15	$0 13	$0 13	$0 23	$61 00	$225 00	$20 00	$1 25	$1 60	$2 60	100	95
Allegheny,	35	18	19	18	25	155 00	300 00	34 00	1 60	2 20	4 35	98	97
Armstrong,	33	17	16	14	25	50 00	260 00	28 00	1 40	1 80	4 00	105	102
Beaver,	34	18	19	19	28	60 00	280 00	32 00	1 60	2 15	4 50	94	96
Bedford,	33	14	13	14	23	45 00	250 00	25 00	1 25	1 60	2 80	97	95
Berks,	....	18	18	18	28	72 00	235 00	22 50	1 30	1 60	3 20	92	96
Blair,	33	15	16	17	26	70 00	250 00	26 00	1 50	2 00	3 00	92	92
Bradford,	36	15	14	15	25	82 00	300 00	30 00	1 50	2 00	3 50	105	102
Bucks,	33	18	17	16	27	75 00	290 00	29 50	1 35	1 90	3 65	96	96
Butler,	33	15	15	15	25	57 00	246 00	26 50	1 55	2 00	4 00	92	93
Cambria,	32	16	18	19	28	40 00	320 00	34 00	1 65	2 00	3 65	93	92
Cameron,	34	18	18	19	28	36 00	300 00	32 50	1 55	2 10	3 80	90	93
Carbon,	....	19	20	20	23	46 00	250 00	23 00	1 25	1 85	3 35	96	97
Centre,	32	15	15	18	26	67 00	242 00	22 50	1 35	1 75	2 75	100	100
Chester,	....	17	17	17	29	58 00	287 00	31 00	1 45	2 00	3 65	93	93
Clarion,	34	13	13	14	22	44 00	256 00	27 00	1 50	1 90	3 50	96	96
Clearfield,	33	16	16	16	28	34 00	292 00	30 00	1 50	1 90	3 20	96	97
Clinton,	35	15	17	13	28	38 00	300 00	28 50	1 50	2 00	3 20	100	99
Columbia,	31	16	17	18	27	40 00	288 00	24 00	1 25	1 60	3 00	96	97
Crawford,	32	18	13	16	24	33 00	300 00	31 00	1 50	2 10	3 80	105	108
Cumberland,	34	15	14	15	26	92 00	240 00	28 50	1 35	1 75	2 80	98	100
Dauphin,	....	14	14	17	28	60 00	250 00	22 00	1 30	1 75	2 50	102	100
Delaware,	....	19	19	19	29	170 00	296 00	27 50	1 45	2 10	3 40	105	108
Elk,	....	16	18	18	[illegible]	[illegible]	325 00	32 50	1 50	2 15	4 00	98	98

Erie,	34	16	18	18	27	46 00	310 00	33 00	1 85	2 25	4 00	106	105
Fayette,	35	17	17	17	26	45 00	287 00	30 00	1 60	2 20	3 50	105	106
Forest,	34	14	15	17	25	40 00	290 00	32 00	1 40	2 10	3 60	103	98
Franklin,	36	15	14	14	23	92 00	235 00	23 50	1 30	1 80	2 40	90	92
Fulton,	32	15	15	16	22	23 00	210 00	22 00	1 20	1 70	2 50	95	94
Greene,	32	13	13	14	22	60 00	245 00	28 00	1 20	1 70	3 25	100	100
Huntingdon,	33	14	14	14	26	31 00	265 00	24 50	1 40	1 90	3 25	94	96
Indiana,	35	16	14	16	25	38 00	295 00	28 00	1 40	1 75	3 40	97	97
Jefferson,	33	13	14	16	22	40 00	300 00	30 00	1 40	1 80	3 40	97	94
Juniata,	35	13	14	15	23	52 00	240 00	18 00	1 15	1 50	2 80	95	94
Lackawanna,	35	18	20	20	27	48 00	300 00	30 00	1 50	2 25	3 70	100	98
Lancaster,	36	18	16	17	29	140 00	260 00	28 00	1 30	1 75	2 80	97	97
Lawrence,	35	18	18	18	26	62 00	300 00	30 00	1 50	2 15	4 25	90	92
Lebanon,	34	15	15	15	27	72 00	230 00	24 00	1 45	1 80	4 20	94	96
Lehigh,	....	16	18	19	28	84 00	285 00	26 00	1 40	1 65	4 00	94	96
Luzerne,	....	18	20	20	32	46 00	257 00	25 00	1 20	1 65	3 00	100	100
Lycoming,	35	14	16	18	26	44 00	290 00	30 00	1 40	1 85	3 10	100	100
McKean,	36	17	18	18	23	39 00	300 00	32 00	1 50	2 20	3 60	100	102
Mercer,	34	15	14	14	24	49 00	250 00	28 00	1 40	1 80	4 00	96	98
Mifflin,	33	15	15	16	23	65 00	210 00	22 00	1 40	1 80	2 75	95	96
Monroe,	30	16	17	19	30	39 00	250 00	26 00	1 30	1 85	4 10	96	96
Montgomery,	....	19	20	21	28	100 00	280 00	30 00	1 60	2 15	4 00	94	93
Montour,	....	15	15	16	28	54 00	255 00	25 00	1 40	1 85	3 00	100	98
Northampton,	....	17	18	21	28	80 00	250 00	28 00	1 60	2 00	3 40	95	95
Northumberland,	....	16	18	19	27	52 00	225 00	24 00	1 40	1 80	2 80	95	95
Perry,	33	14	13	14	23	34 00	230 00	23 00	1 25	1 65	3 00	100	97
Philadelphia,	....	20	19	18	36	280 00	300 00	31 00	1 35	2 00	4 40	92	93
Pike,	....	17	16	15	26	18 00	220 00	25 00	1 06	1 40	3 75	96	97
Potter,	36	14	16	18	24	24 00	320 00	33 00	1 60	2 15	3 75	98	100
Schuylkill,	....	18	20	21	29	70 00	290 00	27 00	1 35	1 80	3 75	99	97
Snyder,	....	13	14	17	24	65 00	235 00	24 00	1 25	1 65	2 50	98	98
Somerset,	33	15	14	15	23	50 00	265 00	27 50	1 30	1 65	2 90	102	100
Sullivan,	34	13	14	14	26	80 00	275 00	28 50	1 25	1 75	3 00	105	100
Susquehanna,	36	15	17	18	28	30 00	325 00	32 50	1 70	2 25	3 70	102	100
Tioga,	38	15	15	17	26	29 00	325 00	31 00	1 50	2 00	3 25	102	100
Union,	....	14	12	15	25	65 00	240 00	23 50	1 40	1 70	2 80	97	95
Venango,	34	14	15	16	24	38 00	270 00	27 50	1 35	1 85	4 00	97	97
Warren,	35	14	16	17	26	24 00	325 00	31 50	1 50	2 00	3 50	100	95
Washington,	34	15	15	15	24	60 00	265 00	29 00	1 50	2 00	4 00	93	93
Wayne,	34	16	18	20	28	27 00	270 00	30 00	1 35	1 90	3 90	....	94
Westmoreland,	34	18	18	18	26	88 00	300 00	34 00	1 50	2 00	3 80	98	98
Wyoming,	35	16	17	19	27	45 00	275 00	28 50	1 45	2 00	3 20	102	105
York,	33	15	15	16	28	56 00	225 00	24 50	1 30	1 65	3 25	100	98
Total,	....	....	....	....	....	....	....	....	....	....	....	....	....
Average,	$0 34	$0 16	$0 16	$0 17	$0 26	$59 00	$270 00	$27 50	$1 42	$1 89	$3 42	98	97

AGRICULTURAL SOCIETIES

The attendance for 1915, 2,004,326 as compared with the previous year, 1,830,722, shows an increase of 173,604; membership, 17,000; amount received from State Fund, $57,355.18; amount paid in premiums, 1915, $140,824.39; amount offered in premiums, 1916, 179,-671.42, an increase of $18,045.00. It will be observed in this connection that eighty-five societies reported this year as shown by the annexed report while only seventy-six reported last year.

List of County and Local Agricultural Societies with Names and Addresses of Presidents and Secretaries and Dates for Holding Fall Exhibitions for 1916, Etc.

County	Name of Society	Name and Address of President	Name and Address of Secretary
	State Horticultural Association of Pennsylvania,	Dr. I. H. Moyer, Willow Street,	F. N. Fagan, State College.
Adams,	Fruit Growers' Association of Adams County,	C. Arthur Griest, Guernsey,	Edwin C. Tyson, Floradale.
Adams,	Biglerville Agricultural, Horticultural and Poultry Association,	E. H. Plank, Gettysburg,	O. C. Rice, Biglerville.
Allegheny,	Allegheny County Agricultural Association,	C. B. Burns, Imperial, R. D. No. 1,	C. B. Burns, Imperial, R. D. No. 1.
Armstrong,	Kiskiminetas Valley Agricultural and Driving Association,	George W. Steele, Apollo,	J. A. Gallagher, Apollo.
Armstrong,	Dayton Agricultural and Mechanical Association,	A. K. Good, Dayton,	C. C. Cochran, Dayton, R. D. No. 1.
Beaver,	Beaver County Agricultural Association,	Dr. J. S. Louthan, Beaver Falls,	M. J. Patterson, Beaver.
Bedford,	Bedford County Agricultural Society,	Dr. S. F. Statler, Bedford,	J. Roy Cessna, Bedford.
Bedford,	Grangers Picnic Association,	J. C. McClure, Osterburg,	George W. Oster, Osterburg.
Berks,	Agricultural and Horticultural Association of Berks County,	W. Harry Orr, 309 S. 5th St., Reading,	D. J. McDermott, 30 N. Sixth St., Reading.
Berks,	Kutztown Fair Association,	Charles D. Herman, Kutztown,	G. C. Bordner, Kutztown.
Blair,	Blair County Grange Fair Association,	Dr. W. Frank Beck, Altoona,	H. S. Wertz, Duncansville.
Bradford,	Bradford County Agricultural Society,	F. G. Kerrick, Towanda, R. D.,	Thomas W. Piollet, Wysox.
Bradford,	Troy Agricultural Society,	J. W. Pomeroy, Troy,	W. S. Montgomery, Troy.
Bucks,	Bucks County Agricultural Society,	W. Elmer Savacool, Benjamin,	I. Y. Baringer, Perkasie.
Bucks,	Farmers' Picnic and Exhibition Association,	Harry S. Johnson, Quakertown, R. D. No. 1.	Jacob M. Landis, Quakertown, R. D. No. 4.
Butler,	Chicora Driving Park Association, Ltd.,	Dr. C. L. DeWolf, Chicora,	W. R. Brown, Chicora.
Butler,	Butler Driving Park annd Fair Association,	G. A. Schaffner, Butler,	W. B. Purvis, Butler.
Butler,	North Washington Agricultural Association,	J. F. Harper, North Wash'ngton,	P. B. Meals, North Washington.
Cambria,	Cambria County Agricultural Association, Limited,	J. Ed. Stevens, Carrolltown,	J. V. Maucher, M. D., Carrolltown.
Carbon,	Carbon County Industrial Society,	O. F. Acker, Lehighton,	J. Albert Durling, Lehighton.
Centre,	Patrons of Husbandry,	Leonard Rhone, Centre Hall,	Leonard Rhone, Centre Hall.
Chester,	Chester County Agricultural Association,	David M. Golder, West Chester,	Fred DuRose Reid, West Chester.
Clarion,	Clarion County Fair Association,	Foster M. Mohney, Clarion,	B. H. Frampton, Clarion.
Clarion,	Licking Valley Agricultural Association,	J. W. Hartman, Sligo, R. D.,	Harry C. Craig, Curllsville.
Clearfield,	Clearfield County Agricultural Society,	Curtis Read, Clearfield,	W. E. Davis, Clearfield.
Clearfield,	DuBois Driving Association,	B. B. McCreight, DuBois,	P. E. Griesemer, DuBois.
Columbia,	Columbia County Agricultural, Horticultural and Mechanical Association,	A. R. Henrie Mifflinville,	Harry B. Correll, Bloomsburg.
Crawford,	Conneaut Lake Agricultural Association,	H. O. Holcomb, Exposition Park,	J. G. Klinginsmith, Exposition Park.
Crawford,	Oil Creek Agricultural Fair Association,	J. B. Pasterius, Titusville,	Allen D. Cooper, Titusville.
Cumberland,	Agricultural Society of Cumberland County,	Abram Bosler, Carlisle,	W. H. McCrea, Newville.
Cumberland,	Great Grangers' Picnic Exhibition,	R. H. Thomas, Jr., Mechanicsburg,	R. H. Thomas, 3d, Mechanicsburg.
Dauphin,	Middletown Fair Association,	A. L. Erb, Middletown, R. D.,	W. K. Rodfong, Middletown.
Dauphin,	Gratz Agricultural and Horticultural Society,	Harry Smith, Gratz,	Guy R. Klinger, Gratz.
Delaware,	Delaware County Agricultural Society,	Thomas H. Wittkorn, Media,	J. M. Rodgers, Wallingford.
Elk,	Elk County Farmers' Agriculture Association,	H. J. Gregory, St. Marys,	E. J. Grotzinger, St. Marys.
Erie,	Corry Fair and Driving Park Association,	D. Warren DeRosay, 161 Maple Ave., Corry.	W. W. Morgaridge, 26 Park Place St., Corry.
Erie,	The Wattsburg Agricultural Society,	A. H. Austin, Wattsburg,	J. F. Dearing, Wattsburg.
Fulton,	Big Cove Agricultural Society of Fulton County,	William Brewer, McConnellsburg,	W. C. Patterson, McConnellsburg.
Greene,	Greene County Agricultural and Manufacturing Society,	N. M. Biddle, Carmichaels,	C. J. Lincoln, Carmichaels.

List of County and Local Agricultural Societies, Etc.—Continued.

County	Name of Society	Name and Address of President	Name and Address of Secretary
Indiana,	Indiana County Agricultural Society,	M. F. Jamison, Indiana,	David Blair, Indiana.
Jefferson,	Jefferson County Agricultural Association,	N. L. Strong, Brookville,	Syl. Truman, Brookville.
Jefferson,	Punxsutawney Fair Association,	Dr. G. W. Means, Punxsutawney,	Joseph M. Williams, Punxsutawney.
Juniata,	Juniata County Agricultural Society,	Stuart A. Robinson, Port Royal,	James N. Groninger, Port Royal.
Lackawanna,	Lackawanna County Fair and Grange Poultry Association,	N. A. Wallace, Clarks Summit,	F. L. Thompson, Clarks Summit.
Lackawanna,	Lackawanna County Horticultural Association,	A. B. Kilmer, Moscow, R. D.,	J. E. Williams, care 3d Nat. Bank, Scranton.
Lancaster,	Lancaster County Agricultural Fair Association,	P. T. Watt, E. Kink St., Lancaster,	J. F. Seldomridge, 34½ N. Queen St., Lancaster.
Lawrence,	Lawrence County Agricultural Association,	K. C. Hayes, Pulaski,	J. P. Buchanan, Pulaski.
Lebanon,	Lebanon County Agricultural and Horticultural Association,	Edgar A. Weimer, Lebanon,	S. P. Heilman, M. D., Lebanon.
Lebanon,	Lebanon Valley Fair Association,	W. H. Bollman, Lebanon,	J. A. Bollman, Lebanon.
Lehigh,	Lehigh County Agricultural Society,	Dr. Victor H. Wieand, 411 N. 7th St., Allentown.	Harry B. Schall, Allentown.
Luzerne,	Wilkes-Barre Poultry and Agricultural Association, Inc.,	J. M. Wilcox, 114 Carey Ave., Wilkes-Barre.	F. N. Roll, 550 Carey Ave., Wilkes-Barre.
Luzerne,	Dallas Union Agricultural Association,	William B. Robinson, Wilkes-Barre,	F. E. Houck, Dallas.
Lycoming,	The Lycoming County Fair Association,	Theo. A. Boak, Hughesville,	Edward E. Frontz, Hughesville.
McKean,	McKean County Fair Association,	E. A. Studholme, Smethport,	Henry J. Rice, Smethport.
Mercer,	Mercer County Agricultural Society,	Joseph A. Bond, Stoneboro,	George H. Fowler, Stoneboro.
Mercer,	Mercer Central Agricultural Society,	John P. Orr, Mercer,	Robert M. Gilkey, Mercer.
Mifflin,	Mifflin County Horticultural and Agricultural Association,	J. A. Esh, Milroy,	H. H. Laub, Jr., Lewistown.
Monroe,	Monroe County Agricultural Society,	Jesse Ransberry, East Stroudsburg,	Henry S. Smoyer, Stroudsburg.
Montgomery,	Montgomery County Fair Association,	David Hoag, 37 High St., Pottstown,	C. M. Shaner, Pottstown, R. D. No. 1.
Northampton,	Northampton County Agricultural Society,	William K. Shimer, Nazareth,	J. R. Reinheimer, Nazareth.
Northumberland,	Milton Fair and Northumberland County Agricultural Association,	James I. Higbee, Watsontown,	William G. Murdock, Milton.
Perry,	Perry County Agricultural Society,	T. H. Butturff, Newport,	J. C. F. Stephens, Newport.
Philadelphia,	Pennsylvania Horticultural Society,	C. Hartman Kuhn, Franklin National Bank Bldg., Philadelphia.	David Rust, Horticultural Hall, Phila.
Somerset,	Somerset County Agricultural Society,	Alvah B. Hoffman, Somerset, R. D.,	John S. Miller, Somerset.
Sullivan,	Sullivan County Agricultural Society,	S. B. Kilmer, Dushore,	O. N. Molyneux, Dushore.
Susquehanna,	Susquehanna County Agricultural Society,	F. A. Davies, Montrose,	W. G. Comstock, Montrose.
Susquehanna,	Harford Agricultural Society,	E. F. MacConnell, Harford,	O. F. Maynard, Harford.
Susquehanna,	Lawton Agricultural Society,	S. C. Birchard, Birchardville,	G. L. Pickett, Lawton.
Tioga,	Cowanesque Valley Agricultural Society,	G. H. Rumsey, Westfield,	J. W. Smith, Westfield.
Tioga,	Smythe Park Association,	John F. Pitts, Elmira, N. Y.,	F. H. Marvin, Mansfield.
Union,	Union County Fair Association,	William P. Mauser, Lewisburg, R. D.,	C. Dale Wolfe, Lewisburg.
Venango,	Venango Farmers' and Fruit Growers' Association,	Caleb D. Sutton, Franklin,	John L. Hanna, Franklin.
Warren,	Warren County Agricultural Association,	Clyde C. Smith, Warren,	Hugh V. Hazeltine, Warren.
Warren,	Warren County Farmers' and Breeders' Association,	D. B. Hitchcock, Russell,	R. J. Weld, Sugar Grove.
Washington,	Washington Fair Association,	H. S. Grayson, Washington,	James P. Eagleson, Washington.
Washington,	Sandy Plains Fair Association,	Andrew Allen, Millsboro,	B. Frank Emery, Millsboro.
Wayne,	The Wayne County Agricultural Society,	E. P. Jones, Ariel,	E. W. Gammell, Honesdale.
Westmoreland,	Westmoreland Fair Association,	J. W. Ruth, Scottdale,	W. F. Holtzer, Greensburg.

Wyoming,	Wyoming County Fair Association,	S. R. Brungee, Tunkhannock,	O. D. Stark, Tunkhannock, R. D. No. 4.
York,	Hanover Agricultural Society,	Charles S. Shirk, Hanover,	S. A. Geiselman, Hanover.
York,	York County Agricultural Society,	John H. Wogan, York,	Henry C. Heckert, York.
York,	New Freedom Farmers' Improvement Association,	W. J .McCullough, New Freedom,	M. F. Zeigler, New Freedom.
York,	Pen-Mar County Agricultural Association,	M. E. Smith, New Paris,	Thomas W. Brown, Fawn Grove.
York,	Red Lion Fair Association,	H. L. Perry, Dallastown,	J. A. Miller, Red Lion.
York,	Stewartstown Agricultural Association,	W. J. P. Gemmill, Stewartstown,	W. H. Ebaugh, Stewartstown.

List of County and Local Agricultural Societies with Names and Addresses of Presidents and Secretaries and Dates for Holding Fall Exhibitions for 1916—Continued.

County	Name of Society	Attendance, 1915	Race track	Membership	Amount received from State fund	Premiums		Held 1916	
						Paid, 1915	Offered, 1916	Place	Date
Adams, ...	Fruit Growers' Association of Adams County.	....	....	224	....	....	....	Bendersville, ...	Dec. 13-15.
Adams, ...	Biglerville Agricultural, Horticultural and Poultry Association.	5,500	....	48	$407 50	$626 60	....	Gettysburg, ...	
Allegheny, ...	Allegheny County Agricultural Association,	12,000	½ mile,	135	732 93	2,382 93	$2,600 00	Imperial, ...	Sept. 26-28.
Armstrong, ...	Kiskiminetas Valley Agricultural and Driving Asso.	16,725	½ mile,	......	1,752 00	1,584 75	....	Apollo, ...	Aug. 30-Sept. 2.
Armstrong, ...	Dayton Agricultural and Mechanical Asso.,	22,000	½ mile,	282	1,324 00	1,389 95	2,500 00	Dayton, ...	Sept. 19-22.
Beaver, ...	Beaver County Agricultural Association,..	15,000	½ mile,	380	1,927 55	1,927 55	....	Junction Park, ...	Sept. 13-16.
Bedford, ...	Bedford County Agricultural Society, ...	7,000	½ mile,	205	1,000 00	780 00	....	Bedford, ...	Oct. 3-6.
Bedford, ...	Grangers Picnic Association, ...	10,000	....	......	....	....	....	Osterburg, ...	Aug. 15-18.
Berks, ...	Agricultural and Hort. Asso. of Berks County.	65,000	½ mile,	2,500	2,050 00	2,450 00	3,000 00	Reading, ...	Sept. 12-15.
Berks, ...	Kutztown Fair Association, ...	45,000	½ mile,	581	500 00	1,068 25	2,000 00	Kutztown, ...	Aug. 22-25.
Blair, ...	Blair County Grange Fair Association, ...	50,000	½ mile,	15	1,000 00	1,170 00	2,000 00	Hollidaysburg, ...	Sept. 25-29.
Bradford, ...	Bradford County Agricultural Society, ...	12,000	½ mile,	300	....	1,560 00	3,500 00	Towanda, ...	Sept. 5-8.
Bradford, ...	Troy Agricultural Society, ...	15,000	½ mile,	3	....	1,006 15	2,000 00	Troy, ...	Aug. 29-Sept. 1.
Bucks, ...	Bucks County Agricultural Society, ...	10,000	....	16	968 91	968 91	....	Perkasie, ...	Sept. 13-16.
Bucks, ...	Farmers' Picnic and Exhibition Asso., ...	10,000	½ mile,	90	....	300 00	....	Quakertown, ...	Sept. 1-2.
Butler, ...	Chicora Driving Park Association, Ltd.,...	3,837	½ mile,	48	550 05	1,362 00	4,000 00	Donegal Twp., ...	Aug. 8-11.
Butler, ...	Butler Driving Park and Fair Association,	55,000	½ mile,	......	....	4,886 05	....	Butler, ...	Aug. 22-25.
Butler, ...	North Washington Agricultural Asso., ...	20,000	½ mile,	60	....	960 00	....	N. Washington, ...	Aug. 29-Sept. 1.
Cambria, ...	Cambria County Agricultural Asso., Ltd....	7,000	½ mile,	382	1,297 75	1,197 75	....	Carrolltown, ...	Sept. 12-15.
Carbon, ...	Carbon County Industrial Society, ...	20,000	½ mile,	45	1,094 32	1,094 32	1,500 00	Lehighton, ...	Sept. 26-29.
Centre, ...	Patrons of Husbandry, ...	15,000	....	1,500	....	282 00	....	Centre Hall, ...	Sept. 9-16.
Chester, ...	Chester County Agricultural Association,..	16,000	½ mile,	210	1,500 00	2,074 25	....	West Chester, ...	Sept. 12-15.
Clarion, ...	Clarion County Fair Association, ...	12,000	½ mile,	277	....	1,207 00	1,136 62	Clarion, ...	Sept. 5-8.
Clarion, ...	Licking Valley Agricultural Association,...	3,000	....	58	....	....	....	Curllsville, ...	Sept. 29.
Clearfield, ...	Clearfield County Agricultural Society, ...	....	½ mile,	470	....	....	4,000 00	Clearfield, ...	Sept. 12-15.
Clearfield, ...	DuBois Driving Association, ...	14,000	½ mile,	150	1,171 20	1,171 20	....	DuBois, ...	Sept. 26-29.
Columbia, ...	Columbia County Agricultural, Hort. and Mechanical Asso.	75,000	½ mile,	673	2,000 00	8,717 01	....	Bloomsburg, ...	Oct. 3-6.
Crawford, ...	Conneaut Lake Agricultural Association,..	28,000	½ mile,	327	1,808 90	2,166 95	3,500 00	Exposition Park,..	Aug. 29-Sept. 1.
Crawford, ...	Oil Creek Agricultural Fair Association, ..	20,000	½ mile,	300	2,000 00	2,200 00	2,200 00	Titusville, ...	Sept. 12-15.

Cumberland,	Agricultural Society of Cumberland County,	2,000	½ mile,	70	1,000 00	1,375 50	1,600 00	Carlisle,	Sept. 18-22.
Cumberland,	Great Grangers' Picnic Exhibition,	150,000	....	....	....	....	....	Williams Grove,	Aug. 28-Sept. 2.
Dauphin,	Middletown Fair Association,	16,000	½ mile,	228	526 00	526 00	3,000 00	Middletown,	Aug. 15-18.
Dauphin,	Gratz Agricultural and Hort. Society,	10,000	½ mile,	59	1,088 70	1,088 70	2,000 00	Gratz,	Sept. 19-22.
Delaware,	Delaware County Agricultural Society,	....	....	100	....	250 00	250 00	Media,	Nov. 24-25.
Elk,	Elk County Farmers' Agricultural Asso.,	16,000	1-5 mile,	125	685 70	685 70	3,000 00	St. Marys,	Oct. 3-7.
Erie,	Corry Fair and Driving Park Association,	30,000	½ mile,	200	2,000 00	2,460 00	....	Corry,	Sept. 19-22.
Erie,	Wattsburg Agricultural Society,	5,000	½ mile,	300	718 55	787 05	3,000 00	Wattsburg,	Sept. 5-8.
Greene,	Greene County Agricultural and Manufacturing Society,	4,800	½ mile,	45	689 40	689 40	3,500 00	Carmichaels,	Sept. 5-8.
Indiana,	Indiana County Agricultural Society,	40,000	½ mile,	....	1,000 00	3,500 00	3,500 00	Indiana,	Sept. 5-8.
Jefferson,	Jefferson County Agricultural Association,	13,727	½ mile,	36	832 25	832 25	....	Brookville,	Aug. 29-Sept. 1.
Jefferson,	Punxsutawney Fair Association,	20,000	½ mile,	130	2,000 00	981 50	2,500 00	Punxsutawney,	Sept. 12-15.
Juniata,	Juniata County Agricultural Society,	25,000	½ mile,	113	785 50	785 50	1,000 00	Port Royal,	Sept. 12-15.
Lackawanna,	Lackawanna County Fair and Grange Poultry Asso.	10,000	½ mile,	93	1,000 00	1,053 60	2,000 00	Clarks Summit,	Sept. 26-30.
Lackawanna,	Lackawanna County Horticultural Asso.,	3,000	....	29	....	113 50	148 00	Scranton,	Dec. 7-9.
Lancaster,	Lancaster County Agricultural Fair Asso.,	60,000	½ mile,	352	400 00	4,075 00	6,500 00	Lancaster,	Sept. 26-29.
Lawrence,	Lawrence County Agricultural Association,	15,000	½ mile,	90	1,000 00	1,327 00	2,000 00	Pulaski,	Aug. 22-24.
Lebanon,	Lebanon County Agricultural and Horticultural Asso.	....	....	....	....	72 95	....	....	Nov. 29-Dec. 2.
Lebanon,	Lebanon Valley Fair Association,	60,000	½ mile,	800	1,000 00	6,019 40	6,019 40	Lebanon,	Sept. 4-8.
Lehigh,	Lehigh County Agricultural Society,	200,000	½ mile,	898	1,000 00	25,485 90	25,485 90	Allentown,	Sept. 19-22.
Luzerne,	Wilkes-Barre Poultry and Agricultural Association, Inc.	2,800	....	85	939 25	939 25	....	Wilkes-Barre.	Dec. 4-9.
Luzerne,	Dallas Union Agricultural Association,	4,890	½ mile,	100	1,701 62	....	2,500 00	Dallas,	Sept. 5-8.
Lycoming,	Lycoming County Fair Association,	18,000	½ mile,	211	1,000 00	1,035 00	1,000 00	Hughesville,	Oct. 10-13.
McKean,	McKean County Fair Association,	10,000	½ mile,	85	1,347 70	1,347 70	5,000 00	Smethport,	Sept. 13-15.
Mercer,	Mercer County Agricultural Society,	32,000	½ mile,	250	2,000 00	2,700 00	5,000 00	Stoneboro,	Sept. 26-29.
Mercer,	Mercer Central Agricultural Society,	25,000	½ mile,	50	2,000 00	2,293 20	2,500 00	Mercer,	Sept. 19-21.
Mifflin,	Mifflin County Hort. and Agricultural Association.	1,000	....	75	110 00	110 00	....	Lewistown,	Nov. 9-11.
Monroe,	Monroe County Agricultural Society,	11,197	½ mile,	....	537 75	537 75	....	Stroudsburg,	Sept. 4-8.
Montgomery,	Montgomery County Fair Association,	16,000	1 mile,	12	950 00	950 00	....	Pottstown,	Aug. 29-Sept. 1.
Northampton,	Northampton County Agricultural Society,	55,000	½ mile,	325	1,000 00	1,970 55	4,000 00	Nazareth,	Sept. 12-15.
Northumberland,	Milton Fair and Northumberland County Agri. Association.	15,000	½ mile,	100	....	1,015 70	5,000 00	Milton,	Sept. 27-29.
Perry,	Perry County Agricultural Society,	1,000	½ mile,	400	500 00	512 95	....	Newport,	Oct. 10-13.
Philadelphia,	The Pennsylvania Horticultural Society,	....	....	940	....	2,040 00	2,500 00	Philadelphia,	Nov. 7-10.
Somerset,	Somerset County Agricultural Society,	1,400	....	125	729 00	803 40	....	Somerset,	Oct. 3-6.
Sullivan,	Sullivan County Agricultural Society,	4,000	....	60	....	426 25	800 00	Forksville,	Sept. 27-29.
Susquehanna,	Susquehanna County Agricultural Society,	5,000	....	74	....	800 00	900 00	Montrose,	Sept. 12-14.
Susquehanna,	Harford Agricultural Society,	4,050	....	101	757 00	761 50	1,773 50	Harford,	Sept. 5-7.
Susquehanna,	Lawton Agricultural Society,	1,800	....	....	....	375 00	400 00	Lawton,	Sept. 7-8.
Tioga,	Cowanesque Valley Agricultural Society,	12,000	½ mile,	26	....	1,000 00	3,000 00	Westfield,	Sept. 12-15.
Tioga,	Smythe Park Association,	40,000	½ mile,	48	1,000 00	2,233 00	2,233 00	Mansfield,	Sept. 19-22.
Union,	Union County Fair Association,	18,000	½ mile,	185	1,000 00	1,100 00	1,500 00	Lewisburg,	Oct. 17-20.
Venango,	Venango Farmers' and Fruit Growers' Association.	2,300	....	90	....	1,200 00	....	Oil City,	Nov. 6-8.
Warren,	Warren County Agricultural Association,	31,000	½ mile,	....	....	2,240 65	....	Warren,	Sept. 5-8.
Warren,	Warren County Farmers' and Breeders' Asso.	....	....	40	....	....	....	Lauder,	Oct. 28.
Washington,	Washington Fair Association,	60,000	½ mile,	....	1,000 00	4,000 00	25,000 00	Arden,	Aug. 29-Sept. 1.
Washington,	Sandy Plains Fair Association,	3,500	½ mile,	....	....	2,000 00	2,000 00	Millsboro,	Aug. 8-10.

List of County and Local Agricultural Societies, Etc.—Continued

County	Name of Society	Attendance, 1915	Race track	Membership	Amount received from State fund	Premiums		Held 1916	
						Paid, 1915	Offered, 1916	Place	Date
Wayne, ...	Wayne County Agricultural Society, ...	12,000	½ mile,	15	100 00	999 35	2,500 00	Honesdale, ...	Oct. 2-5.
Westmoreland, ..	Westmoreland Fair Association, ...	15,000	½ mile,	16	1,000 00	1,522 27	....	Youngwood, ...	Sept. 5-9.
Wyoming, ...	Wyoming County Fair Association, ...	10,000	½ mile,	186	914 70	914 70	2,000 00	Tunkhannock, ...	Sept. 19-22.
York, ...	York County Agricultural Society, ...	210,000	½ mile,	250	....	4,494 95	6,000 00	York, ...	Oct. 2-6.
York, ...	Hanover Agricultural Society, ...	60,000	½ mile,	......	....	2,750 00	2,750 00	Hanover, ...	Sept. 12-15.
York, ...	New Freedom Farmers' Improvement Asso.,	10,000	....	120	....	250 00	250 00	New Freedom, ...	Sept. 21-23.
York, ...	Pen-Mar County Agricultural Asso., ...	19,000	....	78	457 00	534 55	650 00	Fawn Grove, ...	Aug. 9-11.
York, ...	Red Lion Fair Association, ...	8,800	....	7	....	424 70	525 00	Red Lion, ...	Sept. 6-9.
York, ...	Stewartstown Agricultural Association, ...	10,000	....	......	....	450 00	450 00	Stewartstown, ...	Sept. 6-8.
	Total, ...	2,004,326	....	17,000	$57,356 18	$140,824 39	$179,671 42		

BULLETINS

In addition to the other bulletins compiled and published under the supervision of this Bureau during the year 1916, the information for bulletin Number 286 was collected and compiled. This bulletin is entitled, "A Partial List of Owners and Breeders of Registered Livestock in Pennsylvania," the copy of which is now in the printer's hands. The compilation of this bulletin made necessary the mailing of several thousand communications. This is a revision of No. 231 published by this Department in 1912. It shows a much larger number of registered animals in this state than five years ago.

CONCLUSION

Notwithstanding the fact that this State has no law governing the collecting of agricultural statistics and our appropriation for this purpose is small, we believe that the Bureau has done good work; and we are encouraged to exert a greater effort in order that the people may know more about Pennsylvania as an agricultural state.

Respectfully submitted,

L. H. WIBLE,
Statistician.

FERTILIZER CONTROL

Hon. Chas. E. Patton, Secretary of Agriculture, Harrisburg, Pa.

Sir: I beg to submit herewith brief report of the Fertilizer Control work of the Department for the year 1916.

During this period there were fifteen agents employed eight weeks each, in the selection of samples for analysis and the examination of commercial fertilizers and commercial lime products used for agricultural purposes to determine if the provisions of the Acts of Assembly were being complied with. This resulted in the selection of 2,468 samples of fertilizer and 188 samples of lime. Of this number 506 samples were analyzed by the Pennsylvania Experiment Station and the remainder at the Department Laboratory. All of the lime samples were analyzed at the Department Laboratory.

Owing to the limited appropriations made for this work it was deemed advisable to transfer all chemical work from the Pennsylvania Experiment Station to the Bureau of Chemistry. This being an economic matter it was found that the analytical work could be performed more advantageously at the Department than elsewhere.

Of the number of samples selected, 1,377 were analyzed the results of which are published in detail in Bulletins Nos. 282, 288 and 294 of the Department.

A brief summary of this work is submitted herewith:

ANALYSES MADE, SPRING, 1916

	Complete	Rock and potash	Acidulated supplying phos. acid and nitrogen	Dissolved rock	Ground bone
Number of analyses,	217	1	185	66	216
Moisture, per cent,	7.52	4.28	6.90	8.41	5.87
Phosphoric acid:					
Total, per cent.,	10.53	5.33	11.97	16.19	12.16
Available, per cent.,	9.32	4.82	10.61	15.46	....
Insoluble, per cent.,	1.21	.51	1.36	.73	....
Potash, per cent.,	1.17	.62	....	....	....
Nitrogen, per cent.,	1.85	....	1.86	....	3.03
Mechanical analysis of bone:					
Fine (per cent.),	....	....	....	....	47
Coarse (per cent.),	....	....	....	....	53
Average selling price,	$28 24	$16 30	$23 61	$18 27	$36 30

ANALYSES MADE, FALL, 1916

	Complete	Nitrogen and phos. acid (dissolved bones, etc.)	Ground bone	Acidulated phos.	Rock and potash
Number of samples,	298	240	23	104	8
	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Moisture,	6.58	5.31	4.75	4.37	5.27
Total nitrogen,	1.29	1.45	2.94	....	....
Available nitrogen,	.93	1.07	....	....	....
Total phosphoric acid,	10.56	12.00	23.11	15.99	11.11
Available phosphoric acid,	9.07	10.11	....	15.28	9.38
Insoluble phosphoric acid,	1.49	1.62	....	.71	.98
Potash,	1.32	....	....	....	1.60
Mechanical analysis of bone:					
Fine,	....	....	64.04	....	....
Coarse,	....	....	35.96	....	....
Selling price,	$24 97	$21 79	$37 45	$13 46	$21 62

SUMMARY OF LIME SAMPLES

	Number samples	Moisture	Cal. oxide	Mag. oxide	Sulphur trioxide	Insol. matter	Price per ton
		%	%	%	%	%	
Pulverized limestone,	31	.15	45.67	4.76	....	7.57	$4 14
Artificial carbonate of lime,	21	.53	50.44	2.68	....	1.49	6 34
Marl,	6	3.64	46.03	1.36	....	6.05	5 79
Lime,	28	....	72.35	4.18	....	4.31	4 72
Hydrated lime,	72	....	62.16	9.00	....	2.56	7 26
Gypsum,	4	6.89	33.24	....	43.19	9.71	12 00

Where brands were found that were illegally sold the offenders were prosecuted. This resulted in the Department terminating 89 actions with the recovery of $1,906.16 fines and costs which were turned into the State Treasury.

During the year there were 1411 brands of commercial fertilizer and chemicals registered with the Department. Fees amounting to $24,745 were collected and turned into the State Treasury.

There were also 219 brands of lime products registered. Fees amounting to $1,095.00 were collected and turned into the State Treasury.

The reports of manufacturers showed 268,455 tons of fertilizers sold in the State during the year. For the first year under the provisions of the Lime Law, producers reported 312,948 tons sold.

One of the difficult features of the enforcement of the Lime Law was to get the small producer to understand his liability to the same. While Section 1 provides exemption for certain materials, Section 7 provides exemption for such materials in bulk as may be taken from the place of production by consumers with their own teams. The Department used every means to familiarize such persons of the requirements of this Act and I am of the opinion that a better understanding exists between the Department and such persons.

One prosecution was started during the year for violation of this Act and was recently decided by the Court in favor of the Department. An appeal having been taken by the defendant the Court has withheld sentence.

The work as a whole has been prosecuted with the same vigilance as in former seasons. The agents have done all within their power in the limited time allowed them to detect violations and to each I wish to express my sincere appreciation for his faithfulness to his work and his loyalty to the Department.

Respectfully submitted,

HENRY E. KLUGH,
Clerk in Charge.

PAPERS READ AND ADDRESSES DELIVERED AT THE ANNUAL MEETING OF THE FARMERS' NORMAL INSTITUTE HELD AT READING, PA., MAY 23-25, 1916

ADDRESS OF WELCOME

By HON. E. H. FILBERT, *Mayor, City of Reading.*

Mr. Chairman and Delegates of the Convention and Ladies: I can assure you it is a great pleasure for me to meet and welcome you. I voice the sentiments of the citizens of Reading when I say to you that we are very glad to have you with us. We are very happy indeed that you selected our city as your place of meeting, and can assure you that we will do all in our power to make your stay a pleasant one. I ask you, ladies and gentlemen, that between your business sessions, you visit the various places of interest in and about our city. As I understand, you are about to make an automobile trip to Wernersville this afternoon, and to-morrow take a ride over the mountain; but between those arrangements, we would like to have you visit some of the places in our city. We have a public museum located in the boys' high school over in the Administration Building of the high school at 8th and Washington, and our Public Library and our stores—we feel very proud of them. I assure you that if you visit these stores and leave the managers and sales people know that you are strangers, there will be nothing of too much trouble for them to extend to you the hand of welcome and answer any and all questions that you might desire to ask.

I trust that the deliberations of your body may be beneficial to your organization as well as to the public at large. I ask you in particular to arrange for a trip over our mountain roads. From the summit of the mountains you will be able to get a better idea of our city than by being on the surface traveling from one place to another. From the summit it will give you a birds-eye view, and I am sure that you will appreciate it. I ask you, ladies and gentlemen, that when your convention is at an end and you are about to depart for your homes, that you will carry with you fond and pleasant recollections of your stay with us during this convention. Again, as Mayor of the City of Reading, I extend a hearty welcome. (Applause.)

ADDRESS OF WELCOME

By JAMES P. HENNESSY, *President of the Berks County Agricultural and Horticultural Association.*

On behalf of the Agricultural interests of Berks county, I bid you welcome to Reading, noted far and wide for its hospitality to the stranger who comes into their midst either as a transient guest or a permanent resident. The Committee of Arrangements, headed by our worthy Chairman, Howard G. McGowan, has arranged an interesting program for your entertainment between the sessions of the Board, which includes several trips through the county, and I am sure that what you will see will make a more permanent impression than anything I can say for our right to call Berks county beautiful. What you will see on the several trips will also impress you, I am sure, with the ability and intelligence of our farmers and show you the reason why Berks county stands so close to the head of the list as an agricultural county, despite the fact that the county stands third in the State in the value of its manufactured products. While our Berks county farmers, and I might add, not only the farmers but the business and professional men of the county, are noted for their conservatism, yet I am sure you will agree with me that while they are conservative, they are progressive in a good, sound, solid way. And the best proof I can give you of their progressiveness is what you will see when you visit our beautiful new Fair Grounds on your automobile trip which has been arranged for. The Berks county farmers are proud of the fact that you have selected Reading to meet in and I know you will go away feeling that it is a good place to come to.

ADDRESS OF WELCOME

By MR. FREDERICK WILSON, *President Chamber of Commerce, Reading, Pa.*

On behalf of the Reading Chamber of Commerce, we bid you a hearty welcome. We hope you will feel at home in this city and we all want to do our utmost to help make you feel at home. When all is said and done, we realize that the great first source of wealth is agriculture, and while we business men may take the fruits of agriculture and work them up into finished products of various sorts, we nevertheless realize that the first production lies with you gentlemen. Yours is the first source of wealth and we give you due credit for it.

In these days you hear a great deal about efficiency in manufacturing. The business man is very much concerned with making his business more efficient by labor saving processes, by cutting waste in the various forms, and it is a matter of great interest to us to observe that along with the new methods in manufacturing, new methods in agriculture are also coming in, labor saving methods, methods bringing about greater production of crops, better crops, finer products, better stock and in every way increasing the profits as well as the pleasures of farming. One of the most important steps towards the efficiency of agriculture, I take it, is the improvement of your roads, and it is pleasing to see that in all parts of our wonderful and beautiful State, there is a great improvement in the roads.

It has been my fortune to travel quite a little within the last few years in other states, and I noticed that wherever the roads have been improved, there has been a great influx of people from outside, visitors passing through the state from end to end, passing through the country districts, the villages and the cities, observing and commenting on the appearance of the agricultural districts. I am sure that the improvement of roads will not only greatly assist the farmer himself and assist those who live in the various centers in our State, but will also induce others from the outside to come into our State; and those from any State in the Union who once visits Pennsylvania cannot but go away convinced that we have a wonderful and beautiful State, rich and fertile, worthy of all the ambition and all the energy and all the best that is in us, whether we be in the cities of Pennsylvania or whether we be in the country districts.

In behalf, then, of the Chamber of Commerce, I want to say, in a homely way, "Howdy" folks, and to say we are glad you are here and we hope you will enjoy your stay and come again. (Applause.)

RESPONSE TO ADDRESSES OF WELCOME

By HON. CHARLES E. PATTON, *Secretary of Agriculture, Harrisburg, Pa.*

Mr. Chairman: I deem it both an honor and a privilege to respond to the most cordial words of greeting from your Honor, the Mayor, and from the Presidents of the Berks County Agricultural Society and the Reading Chamber of Commerce. I am sure that I voice the sentiment of all the members of this body when I say that we are glad to be here. Your words are but expressive of the hearty welcome already received as we found your doors open to admit us when we entered your busy city.

Your county is one of the ancients in the line of counties, originally belonging to the first county created by Pennsylvania's great Founder. Possibly no county in Pennsylvania, so far as its colonial history is concerned, was more cosmopolitan than what is now the county of Berks.

You have here a city of large manufacturing industries, and in the county agricultural conditions second to none in the State. You of the city take more interest in agriculture than any city of its size that I know of, and you are doing the right thing, for the welfare and prosperity of any nation depends upon her agriculture.

The membership of this Institute is made up of a Chairman from each county, Farm Advisers and Institute Lecturers. We are here as the representatives of 215,000 farmers and have met to review the work of the past year in this State. Our people do not seem to realize the importance of agriculture. We are looked upon as a great manufacturing state, which we are, and also, a great coal mining state. These industries seem to have overshadowed agriculture, and the people do not realize that agriculture is the greatest one industry that we have in the State of Pennsylvania.

The coal output in the greatest year of the State's history was something like $395,000,000.00, this the price at mines, being fifty-four per cent. of all the coal mined in the United States that year. In the manufacture of iron we stand at the head of the Nation, producing about 12,000,000 tons of the 28,000,000 tons manufactured in the United States.

Agriculture produces every year in the State of Pennsylvania products worth over $400,000,000.00; that is the price of the product received by the farmer, not what the consumer pays for it.

From this you can readily see that every working day in the year there is sold on an average by the farmers of the State $1,300,000.00. I would say that at least $1,000,000.00 goes back into the avenues of trade, so that the transactions arising from agriculture amount to over $2,000,000.00 for every working day in the year. There was paid out by the State last year alone $40,000,000.00 for male farm help, your county here paid over one million and one-half for help.

The State of Pennsylvania stands about sixth in the United States in agriculture. We have what is different from most states, in that we have more of a diversified production. Most of the states are what we call one crop states. Take Illinois, Indiana, Missouri and Iowa, their main crop is corn; take the Dakotas, Minnesota and the Northwest they are in the great wheat states, the Southern states, cotton and tobacco are the main crops, virtually all their agriculture consists of one item, while in Pennsylvania four or five of the leading cereals are very close together in valuation; so that if we have a failure of one crop it does not affect us as much as it does where it is virtually a one crop state.

We believe that the success of agriculture will depend upon the cooperation not only between the farmers themselves but between the farmers and the consumers, and the Department of Agriculture is working to that end. We have taken up the organization of a Bureau of Markets, and through that Bureau expect to help both the producer and the consumer.

RESPONSE TO ADDRESSES OF WELCOME

By E. B. DORSETT, *Farm Adviser, Mansfield, Pa.*

Mr Chairman, Mr. Secretary, your Honor, Ladies and Gentlemen: Some years ago a minister went home with a farmer member of his little flock for dinner, and while the good wife was preparing the chicken and other things fit only for ministers to eat, the farmer was entertaining the minister with his deeds of valor during the days of the Civil War. He went on for an hour and a half and finally, when there came a lull, the little boy looked up into his father's face and said, "Father, didn't anybody help you put down the Rebellion?" And as I thought of these gentlemen in the good old county of Berks, I wondered whether we had any other counties in Pennsylvania or not? (Laughter and applause.) Then ,too, your Honor and Mr. Chairman, I would not give much for a man who would not stand up for his own county, for his own state and for his own nation. I believe that Pennsylvania is the best state in the Union, (applause) and I believe that the United States of America is the best country on the face of the globe, (applause) and I believe that today we ought to be indeed grateful that we are at peace with the world.

Now we are here today, as has been suggested by these many people, as representatives of one of the greatest callings known to man, and I was pleased to know that our good friends here in Reading recognize the fact, because it has not been so many years back that agriculture received its just recognition from the hands of our friends in the towns and cities, and I believe it is a hopeful sign when the farmers can mingle, as we are mingling here this afternoon, with the other industries in our great State, and I believe too, that much good will come out of a meeting of this kind and I have often wondered whether it would not be a good thing for the Chambers of Commerce and the Boards of Trade throughout the Commonwealth if they would invite some of these hard-fisted old farmers to join their organizations, let them come in and take part in their deliberations and see if we cannot get on some common ground where we can agree.

We are here this week to discuss problems of great moment, problems which affect us all, no matter where we live, no matter what we do, but problems which affect the very life and existence of the people of this great Commonwealth; problems, as you will see by looking over the program, relative to roads, to animal husbandry in all its different phases, to poultry culture and horticulture. All of those problems are of vast importance and mean much to us all. It is not likely that we will arrive at the correct solution of them all, but you know that in a multitude of counsellors there is wisdom, and I feel that we here, the Chamber of Commerce and the Board of Trade and the various societies of this city discussing these problems with us, will bring out some thought, some point that will be beneficial to us all.

The one problem that I think you will be interested in was referred to by the Secretary, that of marketing that which we now produce. Yesterday in the great city of Philadelphia I spent an hour or more with a representative of the Department of Agriculture who belonged to the Market Bureau, and I learned something of what their plan or system is. He showed me the telegraphic reports which came in there every morning and what use they made of them, and the thought came to me then, as it has many times in days gone by, why cannot we farmers have these reports just as well as the man in the city who is handling our products. I am not here to criticise, not at all, the Department of Agriculture in that respect; it is doing a great work, but I say that much of that will be lost unless the farmer gets it. I believe that the National Department of Agriculture and our State Department of Agriculture should work in the interest of the farmers, not that we should be selfish, but I believe when we do anything that shall help the farmer, then the man who lives in the town and the city is bound to get part of it, and so my thought was, as I looked over those reports and was told what was done with them, what a pity it is that we do not at this present moment in Pennsylvania have a Bureau such as was referred to by our Secretary, where those reports could go out every day to the farmers of Pennsylvania, to the various organizations, to your Farm Bureaus, your granges and your farmers' clubs and your farmers' unions and even to the large farmers individually. I believe that is the way to keep the farmer in touch with the markets of the world.

One of the things that interested me in those reports was the number of cars that are leaving the stations each day, and giving their destination. I noticed that over in Arkansas day before yesterday, a hundred and thirty some cars of strawberries were shipped out of the state and a hundred and some out of Tennessee. Well, now, the point is here: In this State when we have this Market Bureau of Information or whatever it may be called, by a system of telegraphic and telephone reports, we can tell each morning just how many cars of farm products were moved the day before and to which point. Perhaps we can so regulate it that we can even get it down to smaller shipments, and in that way we can keep the farmer in touch with the markets of the world and at the same time prevent that glut that we sometimes have, so often have, in our markets. Then, again, I believe that by a system or organization such as will doubtless be discussed tomorrow, that it will be possible for the farmers to so organize and store their goods at home in inexpensive warehouses, that they can hold them for a length of time and not be obliged to sell at a time when the market is glutted or at low ebb. Then, again, we are now at the present time in Congress and have been for sometime studying a rural credit system. I am not going to discuss it this afternoon, but I want to say to you farmers that we have it within our own power to establish a credit system that will meet all our needs and demands and be far superior to anything that has yet been suggested in Congress. I believe, too, that by a system of warehouses, for instance, where they grow potatoes like Lehigh and part of Berks, or apples like Adams county or Butler, or milk like Tioga and Bradford, or tobacco like they have in Lancaster, where they have those organizations and the warehouses can be established and the farmer who needs the money puts his goods in the warehouse and takes a warehouse receipt and that receipt shall be collateral at any bank if he desires to borrow money. What better credit system do you want than that? And that is ours.

Why should the Government go into a banking business and why should the Government lend the farmer any more than lend to anyone else? I cannot understand. I think that Uncle Henry Wallace was pretty near right when he said that all they want is to make it easier for the farmer to get into debt, and so I think that we here, who represent this great calling, have it within ourselves to settle many of these problems. And for one, I am very glad, your Honor, to have the privilege of responding to your words of welcome and I assure you that they are heartily appreciated and we hope that our short stay here with you will be both pleasant and profitable and that when we have gone back to our several homes, you will feel that our coming left a little ray of sunshine and that, as the days may come and go, the friendships which shall be begun here this week will ripen in the future and bring forth much fruit. (Applause).

POTATO CULTURE

By H. M. ANDERSON, *New Park, Pa.*

Mr. Chairman and Friends: I hope you will be a little bit lenient, because, when I accepted this invitation, I expected to make an elaborate speech, but you know just how much time a practical farmer and fruit grower has to devote to speech-making, and I may say as a matter of fact, that I made my speech yesterday morning before breakfast, and I am just going to talk in an informal way about some of the factors that enter into profitable potato growing.

I will speak, first, about the markets and the soil that you are farming; they are not under our control, but they should be taken into consideration. If I was sure of a good market, I would undertake to grow potatoes at a profit on practically any soil in the State of Pennsylvania, only demanding that it was well drained or could be well drained. On the other hand, if I had a soil that was well adapted to potato growing, I would undertake to grow potatoes at a good living profit no matter what the market conditions were; I would undertake to find a market if I had the proper soil, but if you haven't got either the market or the soil, you don't want to go into potato growing because you are fighting an up-hill battle all the way through.

Another thing that must be taken into consideration but is not under our control is the weather. The weather I believe is of all things the most variable and on the whole at least dependable. Yet it was Noah that the Lord promised that seedtime and harvest should not fail in the earth. I have noticed that farmers who make conditions right at seedtime and practice the right sort of cultivation in the spring during the growing period of the potato are going to show up mighty good and strong at the harvest end of the proposition, and you have only got to do your part and trust weather conditions to the Lord and you are going to make money out of potatoes if you have either a good market or the right soil.

Now I will take up a little more in detail the factors which are under our control and must be taken into consideration first. I will discuss the vegetable matter in the soil, the conditions which we can change at will. The greatest essential proposition to successful potato growing is plenty of vegetable matter in the soil. I do not think we can put too much emphasis on that. I have been spoken of as a crank on that subject, but that is not such an opprobrious name after all because a crank is instrumental in turning things and if we could turn the farmers from some of their old methods to some of the methods we would like to turn them to, we are going to wonderfully aid those farmers in making money on their farms. I don't care how you get vegetable matter into your soil, but by all means get it. I believe that Solomon said you should get wisdom and all things would be added thereto. I believe that if Solomon was living today and was speaking at a normal institute, he would say, "Get vegetable matter, get humus and all things will be added thereto," because there isn't anything so necessary to successful farming, successful potato farming as vegetable matter. Those who feed cattle can get vegetable matter in the way of manure. Those whose conditions are such that they cannot go into that line, can get all the vegetable matter they need by cover crops.

We have been trying to get it both ways. At my home, in my vicinity, I came over from York county, from York County Barrens; those who have been in that part of York county probably have not been able to recognize it as "barrens," but that has been due to the use of crimson clover as a cover crop during the last 28 or 30 years. And then another feature in our farming, we have taken the York County Barrens and made that land one of the most fertile spots in Pennsylvania, and no other feature has been as important in that work as the use of crimson clover as a cover crop following the corn. Now I know that a lot of people here will say, "We cannot grow crimson clover." If you cannot grow crimson clover, you can grow red clover, and if you cannot grow red clover grow sumac, get a legume if you can; if you cannot get a legume, grow rye. You must grow cover crops of some sort, a leguminous crop by preference, of course, but if you try it and demonstrate to your own satisfaction that you cannot grow a legume, grow some other cover crop, but get a cover crop to plow into your soil, no matter how you have to get it. Perhaps that is enough along that line.

Now I want to talk a little about the preparation of the soil. I don't think I will say very much about the plowing of it, but I do want to say a few words about disking the soil before than any other one thing. I bought a tractor and an engine disk, it is plowed. I think it is a serious enough matter to disk that soil before it is plowed, to buy a tractor with that idea in view more double acting disk, particularly to disk my ground ahead of the plow and I am sure it is going to be a paying proposition. Of course I need the engine for belt work and expect to do some plowing and some other farm work with it, but I bought it primarily to disk the ground ahead of the plow. You say that shouldn't be necessary, take the team and do it. Those who have done it with the team, don't want to do it the next day, it is practically a horse killer, you have got to have a good team and give them plenty of time, and I have always felt too kindly to my team to hook them to a double acting disk and ask them to disk before and after the plow, but the tractor does not get tired and does not get over-heated. I have a friend in our part of the country who tells me that during the past five years he has been disking his potato ground and growing 50 more bushels of potatoes per acre through that disking ahead of the plow than he could have done without it I'd rather talk about doing something like that myself than talk about somebody else doing it; moreover, I'd like to have had those extra 50 bushels of potatoes; I'd like to have had them myself, but I felt too kindly to my team.

The CHAIRMAN: Do you advise rolling your field?

MR. ANDERSON: I do not believe the roller has any business in the potato field at all, and we do not want to pack that soil a bit more than we can possibly help. There are times when a drag or roller can be used; but I think it is about the last instrument to take into the potato field. We want to harrow it some but no more than we have to before it is planted. People say harrow it as thoroughly as you possibly can, but those who are growing potatoes early, and you have got to grow them either early or late, find that the soil is pretty moist and will pack pretty hard through the tramping of the horses feet and the wheels of the machinery you use during the early part of the season, so I do not like to harrow any more than I have to, to get the ground in fairly good condition before it is planted. After it is planted, I believe that the first cultivation is another of the most essential features in potato growing. I think that first cultivation should follow the first good rain after the potatoes are planted. I cover them shallow in the first place because I want the sun to warm up that piece of potato and get the sprouts started and get the plant started as quickly as I can. I find that by covering it an inch or two, I can get the potatoes to come up a week earlier than when they are covered five on six inches deep, and we want to push the growth of that plant as much as we possibly can and I do not like to use that first work any sooner than I can possibly help, but I think it is so essential to follow the rains with cultivation, and after the first good rain I get in there with a two-horse worker and work the rows as deep as they will stand, and I would like to work it four inches deep if I could and I do go as deep as I possibly can. I want to loosen up that soil which has been packed by the harrowing and the planting of the crop, I want to get it loose and open. I think it was about seven years ago that we began that practice down in the lower end of our county and that was a year of very severe drought; the best farmers in that part of the county that year grew about 100 bushels of potatoes to the acre; there were only six of them and practically all had used that method. I remember very distinctly that I went out to visit an old uncle of mine one day after my potato crop had been harvested and asked him how it was, and he said, "I had 110 bushels on a measured acre." I said, "I guess you worked them before they came up like the rest of us." He said that he did not. So I asked him what he did do and he said, "I walked over the patch one day and the ground was so darn hard that I just went in and got a new shovel plow and hooked the horse to it, and one horse couldn't pull it and I got another and just raked it furrow deep on both sides of the row." Of course he got results just as the others did. Another of those gentlemen was a neighbor on an adjoining farm. He gave them that deep work; he worked four acres of them and because of a period of wet days he failed to get the other three acres worked, on account of that series of wet days, but on the four acres he worked, he grew 100 bushels per acre; on the other three that he did not work, he grew about 71 bushels per acre. He said that the ground had all been farmed and fertilized the year before and that every condition, so far as he knew, was exactly the same on the whole seven acres, except that the four acres had that one deep cultivation before they came up and the other three did not; the season was the same and everything, and he said he knew no reason at all to which that was due except that one deep cultivation.

Now let us go back a little and take up the seed itself, because that is another thing very essential to potato growing. I think it is ten years ago that I first selected seed potatoes by hill selection. I went into the field of potatoes which was making 250 bushels to the acre, took a fountain pen and a note book and a set of scales and a few crates and went down through that patch and dug hills which appeared to be good, healthy, strong growing hills, but I did not take any hills which do not have a hill growing on each side; I wanted only good and healthy hills that had normal conditions surrounding them, and if I took a hill which had no hill growing on the other side, of course on one side it had a little better chance to grow. I always plant with a planter and plant 32 by 14 inches. I dug probably 200 or 300 hills in a patch; I dug the hills that appeared to be the best hills I could find. Out of those 200 or 300, I selected 70 hills which produced at the rate of between 450 and 760 bushels per acre. Some of you perhaps will be a little surprised to know that there is that much difference in a crop of potatoes. You have a field that is making 250 bushels to the acre and you think most of the hills are producing at the rate of 250 bushels to the acre. I thought so too, but when I went in there with the scales and dug and weighed the crop, I found that I had hills producing 66 bushels per acre and other hills that were producing 766 bushels per acre, there was just that much difference, under the same conditions so far as I could see, due entirely to the difference in the seed. That showed me the value of hill selection in potatoes. I selected 70 of these hills. On the largest potato in each hill I marked with my fountain pen the number of the hill and the number of potatoes in the hill and the number of ounces that hill produced.

Now each potato from hill No. 1 for instance, had the number of the hill on it and the largest had those other figures, the number of potatoes and the number of ounces. The potatoes from each hill were put in a crate and a piece of paper laid over that part of the crate, and hill No. 2 was put in the same way, and in that way I put about 17 hills in each four crates and put them away for planting next spring. Of course I kept a record too, in my note book of the productiveness of each hill and the crate in which it was placed. The next year I planted those potatoes by hand; I put a numbered stake at the beginning of each hill. Those stakes were possibly two feet high, in fact, they were a little too high to get over the ground with a two-row worker, and consequently I had to work them with a one-horse cultivator. I had to discharge one of my hands and we were building a local railroad in the community and home labor was almost unobtainable and you can understand why I only worked that plot of potatoes once while I worked my main crop three or four times. The main crop I worked with a machine. But from the seed plot, those 70 hills planted on exactly one-sixth of an acre, produced 57 bushels of good marketing potatoes, or at the rate of 342 bushels to the acre. My main crop made me 240 bushels to the acre. There you had an increased yield of 142 bushels of potatoes due, so far as I know, to better seed, in spite of the fact that it did not have the cultivation it should have had. I believe that if that plot of potatoes had been cultivated as well as the main crop, they would have gone nearer 400 bushels than 340. Of course the next year I used those 57 bushels for seed and the rest of my seed was taken from the main crop. Where I used those 57 bushels, I had 35 to 40 per cent. more potatoes than where I used the rest of the seed. I do not know that that was due entirely to the merits of the seed, because they were planted a few days earlier than the others. Since that my seed has all been taken from the selected seed and I have not been able to trace that special lot further than the two years, but I am fully convinced that I have derived hundreds, I might say thousands of dollars from that two or three days work I spent in selecting those seed potatoes, and it is possible, in fact it is necessary for every farmer to do the same thing. It is necessary from the point of view of keeping your seed clean, keeping out the diseases which are being introduced every year from Europe and from other foreign countries. I will take that matter up later, however.

I just wanted to add that as another reason why hill selection is absolutely necessary now-a-days. They tell us down in York county that we are foolish to use our own seed potatoes, but I want to say that until I get as uniformly good crops from northern grown seed as I can get from my own selected seed, I propose to use the home grown seed for the main crop at least. I have bought northern seed occasionally, but I buy in a small way to see if it shows up good. I am using at the present time a variety I bought in Michigan four or five years ago, and am trying to breed them up as I did the others, which were a long and I found not a very marketable potato. I have got to start all over again with a new variety, but I think it is a much better variety fundamentally and that it will pay me to do that.

A Member: How did you cut those seed?

MR. ANDERSON: Just as is customary in ordinary field practice. The idea was to put about 12 or 15 bushels to the acre, that is on good large potatoes they were cut with a single eye, if they were smaller, they were cut with a couple of eyes; you get a seed block of possibly an ounce.

A Member: Did you plant the hills 14 inches apart?

MR. ANDERSON: Yes, sir. I have conducted a few experiments along the line of cutting, too. I think it is about 5 years ago that I tried my first experiment along that line. I planted three rows side by side with the same fertilizer conditions and every condition the same as far as I know. One row was planted with potatoes cut to one eye; the row beside it, with two eyes and the next row was planted with small, whole potatoes. That year I got 40 bushels per acre more potatoes from those cut to two eyes than from those cut to one eye, using about 11 or 12 bushels of seed to the acre. Where I planted the small whole potatoes, I got about 50 bushels more per acre than I got from those cut to the single eye. I tried it out a number of years after that but did not have the same weather conditions as that year nor as good soil and I have not found that small whole potatoes are as profitable as large potatoes cut to two eyes. I have tried cutting them to one or two eyes on other occasions and have uniformly cut too large pieces of potatoes. I believe that 15 bushels to the acre will give you 30 bushels per acre more than 10 or 11 bushels will give.

A Member: Would it be advisable to use small potatoes every other year?

MR. ANDERSON: If you have good soil and a good season, you can grow more from small potatoes and large potatoes, but if you don't have good conditions, I think you will find that where you cut to one or two eyes you will have more marketable potatoes. Where you use small potatoes, if everything is right, you will have a whole lot of bushels, but you have got to have everything right.

A Member: You say you plant 32 by 14 inches?

MR. ANDERSON: Yes, sir.

A Member: How can you get that amount of seed on an acre?

MR. ANDERSON: That is what you usually put on, 15 or 17 bushels to the acre. After we got up near the seed end, we simply cut it in two and each of these pieces will have probably three or four eyes. We do not divide the potatoes up so that each piece has only one eye, of course that would not be practicable but we tried to get a uniform sized block of potatoes and if the potatoes are large you cut with a single eye down at the lower end where eyes are scarce, and then cut the upper end about the same size.

A Member: When you speak of the small potatoes, how small do you mean?

MR. ANDERSON: I mean potatoes that are not marketable. We think we can market potatoes the size of an egg. When I speak of small potatoes, I mean smaller than the marketable size. Generally all the potatoes will come up but not always. You will always notice that the eyes next to the seed end will sprout first and frequently the eyes near the butt end will sprout and not come up at all.

If weather conditions are right, too many will come up; that is the objection to planting small potatoes and you will have a good many more small potatoes than marketable potatoes.

A Member: Do you find that the end containing the terminal butt will come first if that is cut cross-section and give the other end a chance?

MR. ANDERSON: Certainly it won't, but where you plant the whole potato, the seed end eyes will come first.

A Member: You won't get many more vines?

MR. ANDERSON: From a small whole potato?

A Member: No, because the sprouting end, the terminal butt will exhaust the vitality of the other end.

MR. ANDERSON: I know you won't get many from the butt end of the potato, but you will get too many from the seed end. Perhaps you have your hills wider apart.

A Member: Twelve inches.

MR. ANDERSON: Well, it is just the same thing. I would suggest that you cut your potatoes like I cut mine, by hand. I wouldn't let a man bring a potato cutting machine on my farm and use it, if he would do it for nothing and board himself. I want to hold the stem end next to me and cut from slightly above the eyes toward the butt end of the potato, just as you would sharpen a pencil, in this way, have the seed block back of the eye so that the plant food can push right up and out and develop a plant as quickly as possible. If you cut the other way and have practically none of your seed block back of the eye, you have practically none of that block of seed available for plant food for that plant until it gets its root system established.

A Member: You get five or six pieces from one potato, don't you, cutting that way?

MR. ANDERSON: A large potato, yes, sir.

A Member: What do you use for fertilizer?

MR. ANDERSON: Well, we didn't use potash this year. We always have used it in the past but we did not use it this year.

A Member: That is why I asked that question. A friend of mine in the county has been growing potatoes for some years and rather successfully, he grows generally 225 or 250 bushels per acre, and I have been growing some and using complete fertilizer and stable manure and corn stalks, and he told me that he was not using anything but stable manure and sixteen per cent rock, half a ton per acre.

MR. ANDERSON: Sixteen per cent rock is pretty good stuff to grow potatoes with. With my experiment I got more potatoes to the acre, I think a third more, from 16% rock alone than from a complete fertilizer of an equal number of pounds. That was a conundrum to me, too. I had eight or ten plots of different analyses. I fixed the fertilizers myself; I could not give you the exact analysis of any one of them, but I used muriate of potash, high grade tankage, nitrate of soda, but where I had an analysis of three, eight and five or three, eight and seven, I did not get as good results as I did from 16% rock alone. That was the first year. Next year I repeated that experiment and got better results from a complete fertilizer.

A Member: Was the humus in the soil the same in both cases?

MR. ANDERSON: No, the first experiment was on a poor piece of land and the second was on good land.

A Member: From the humus you have got the vegetable matter there.

MR. ANDERSON: But we did not have the vegetable matter in the first experiment: I don't know why, but for some reason that rock gave me better results than where I used rock fertilizer for the phosphoric acid. In the other plots, in every place where I used rock, I got better results than where I got my phosphoric acid from bone or some other source; but the next year's experiment did not bear that out. I simply give that for what it is worth; the matter was brought out by Mr. Herr.

MR. HERR: What would you say to this fertilizer; stable manure and corn stalks ground with half a ton of 16% aciduplated rock?

MR. ANDERSON: That is all right; the stable manure furnishes more potash than phosphoric acid, and more ammonia. He was getting a complete fertilizer all right; his stable manure was high in the other two elements and his rock gave him plenty of phosphoric acid. He really had, he probably did not realize that he had, but he really did have a complete fertilizer when he combined the two, and that is what you want to grow potatoes if you can get it. This year you have got to grow potatoes without potash.

A Member: Isn't it regulated by the moisture in the soil during the growing season?

MR. ANDERSON: Yes, sir, very largely.

A Member: If you combined either the one or the other, would you rely on acid phosphate?

MR. ANDERSON: Yes, sir, it is a little bit the cheapest form and it takes a very little bit of lime to neutralize the acidity formed by the phosphoric acid. I am a very good friend of 16% dissolved rock.

A Member: In that rotation, you would be sure to have clover?

MR. ANDERSON: Yes, sir, and be sure to have crimson clover and the corn.

A Member: And you would have unleached manure?

MR. ANDERSON: I would like to have, yes, sir.

A Member: Is it practical to follow potatoes with potatoes?

MR. ANDERSON: No, it is not practical; the only objection is the disease, which you will find will drive you out of business. I know that people are practicing a three year rotation of potatoes, clover and wheat and are making money at it, but sometime those fellows are going to quit and quit at a loss, because they will find, that potato diseases will put them out of business. You cannot keep your field clean incidentally growing potatoes in a three year rotation; you have got to have clean seed and clean soil if you are going to avoid those diseases. If you once get them into use, you will find that they are there waiting for you the third year and may be they are waiting for you the fifth year and that is where it grinds all of us.

A Member: In using stable manure, when do you apply it?

MR. ANDERSON: I would apply it to the timothy crop or the mixed hay crop preceding the corn. I would grow a good crop of hay, plow down a good heavy sod of corn; I would grow just as much corn as if that manure was applied direct and grow pretty near as many potatoes on that corn stalk ground as if I applied that manure direct to the potato. I do not believe the place for manure is applied direct on the potato crop at all; I have not manured potatoes direct in ten years. I do not think I have. Corn is a gross feeding plant and will work up the manure right enough. We find that by putting the manure under the hay crop and making bacterial conditions congenial there, we are making plant food available, getting a heavier sod to plow down, and the corn crop is going to work up the heavy sod and incidentally we have got a ton more of hay to the acre, and just as much corn and just about as good a chance for potatoes. If you apply the manure direct for potatoes, particularly horse manure, you are making conditions favorable to scab; that is another reason why I do not like to put the manure on the potato crop.

A Member: How are you going to counteract that?

MR. ANDERSON: Well, if you have clean seed and a five-year rotation, you should not have to counteract it, it should not bother you. I have not been bothered for years, simply because for several years in succession, I treated my seed with formalin, got it perfectly clean and kept it clean. Two years ago I had a couple of thousand bushels of potatoes and I didn't have a bushel that showed a sign of scab. Now, if I had bought Maine seed and introduced scab each year, I would have had to treat that seed each year to keep it clean.

A Member: Do you think the scab will stay in the ground?

MR. ANDERSON: It will stay in the ground if you plant the seed in the same ground again, but if you plant them in a piece of ground that has not had potatoes for five or six years, I do not think you will have any scab, but if you are buying Northern seed, treat it with formalin. If I do not know the conditions under which the seed grew, I would risk the expense of treating that seed no matter how nice they looked when I got them, because you do not know what you are introducing in your farm when you buy seed from somebody else; that is why I want to use my own home-grown seed.

A Member: How is the application made, broadcast or in the row?

MR. ANDERSON: We have used it in the row, but it is not practicable. When you use a ton, apply half of it broadcast and half in the row. The fellows in Maine that grow potatoes use a ton of fertilizer to the acre and we in Pennsylvania are using about half a ton, and then other fellows using two or three hundred pounds of fertilizer, are growing fifty or sixty bushels of potatoes to the acre. The more fertilizer you use, the more crops you are going to have; it is not practicable to use more than half a ton this year on account of the higher prices, but after this I am going to use considerably more than that because it will pay to do it.

A Member: How much do you put on with the Robbins' Planter?

MR. ANDERSON: I can put on about six to eleven hundred, it depends on the drilling condition of the fertilizer.

A Member: Do you use that when you are planting?

MR. ANDERSON: Yes, sir.

A Member: Do you mix it with the dirt ahead of the planter?

MR. ANDERSON: Yes, sir; that is put in; if not mixed with the dirt, before the potatoes are dropped, it will give you an injurious effect. I do not advise you to use half a ton to the acre and use it all in the row, but we do it because we can get the potatoes planted a little earlier that way and every day you advance the planting of the potatoes will increase the productiveness of the crop.

A Member: What is your five-year rotation?

MR. ANDERSON: Corn, followed by crimson clover, followed by potatoes and soy beans, possibly tomatoes and perhaps ensilage; corn that is followed by wheat and clover and timothy one year, and possibly timothy the second year; if it does not suit me to manure that ground I do not want timothy the second year. I believe that the shorter the rotation, the more practical it is going to be. I think the four-year rotation would be better, but we do not all build as we know. It has suited me better to adopt the five-year rotation and largely we have used it.

MR. FIRST: I wish you would just repeat that rotation.

MR. ANDERSON: Corn, followed by crimson clover as a cover crop; that followed by potatoes, another leguminous crop, I grow quite a few soy beans; most of the people follow corn with potatoes and oats; I quit growing oats and never expect to grow any more because it does not pay me, I can make more money out of potatoes and soy beans than out of oats.

A Member: Do you fertilize your crimson clover?

MR. ANDERSON: Oh, no.

A Member: What do you do with the soy beans?

MR. ANDERSON: We sell them direct.

A Member: What variety of soy beans do you grow?

MR. ANDERSON: A medium early bean. I have tried one or two others, but the one called the medium green, not very green, but the early green seems to be a little better adapted to my conditions than anything else I have tried.

A Member: Don't they shatter?

MR. ANDERSON: Yes, unless you cut them soon enough.

A Member: How many bushels can you grow?

MR. ANDERSON: I have grown as little as seven and as many as twenty-five; that was before I knew they must be cut before the foliage drops. If they are cut with a binder before the foliage drops and allowed to stand in the shock until they are dry enough to thresh, they will shatter practically none at all.

A Member: How do you thresh them?

MR. ANDERSON: Take out all the contents, speed your cylinder as slow as you possibly can and you will crack very few of them if they are not too bone dry; then you thresh them. I had seventy-eight bushels on three acres and a half; I sold practically all the crop at three and a quarter, so that paid me better than oats the way we grow oats in our country.

A Member: Do you sell those to the seed market?

MR. ANDERSON: Yes, they went to New York.

A Member: Do you plant in rows or drills?

MR. ANDERSON: Twenty-one inch rows with a grain drill.

A Member: How many bushels does it take to the acre?

MR. ANDERSON: I use nearly a bushel; most people advocate thirty-five or forty pounds.

A Member: What time do you plant them?

MR. ANDERSON: I would like to plant them from the middle to the 20th or 25th of May. But this year, owing to the late season and bad conditions, our ground is not plowed yet; we will get them planted the first of June or last of May; you can get them planted as early as the middle of April or as late as the middle of May and you will have fair success.

A Member: Have you had any noticeable results following the soy bean crop?

MR. ANDERSON: The results have got to be very decided or you won't notice them, and I have not had enough better results following the soy bean crop to notice them; I believe they are somewhat better but don't know how much; they are enough better to be noticed.

A Member: I asked that question because of the results I have gotten from raising the soy bean and following the soy bean with wheat, and where I had the soy bean, the wheat is much nicer than where I had oats.

MR. ANDERSON: Yes, wheat does do better after soy beans than after oats. It stands to reason that a leguminous crop is bound to make the soil better.

A Member: Did you inoculate?

MR. ANDERSON: Why, I have inoculated for a whole lot of legumes and spent more money in inoculation than I ever derived. It is good in theory, but in actual practice you will find that a second planting will always find bacteria there.

A Member: You have been using soy beans for so long that you are not inoculating?

MR. ANDERSON: Yes, but then I had good results from the start without inoculation.

A Member: As good as you have to-day?

MR. ANDERSON: Yes, sir, I grew as good crops the first two or three years as I ever grew.

A Member: Well, I saw patches of scab pretty near as large as the end of my little finger on your soy beans.

MR. ANDERSON: Yes, I had the bacteria all right, I don't know how I got it, but it is there. This soy bean crop and crimson clover crop are essential to the success of potatoes. I don't know much about the cowpea, the soy bean suits my condition so much better that I use it. The cowpea is adapted to the South, the Canadian field pea to the North and I believe the soy bean is the best of the three for us.

A Member: Do you raise the soy bean for the purpose of benefiting the soil or for producing the money you make out of the bean itself?

MR. ANDERSON: Primarily for the money and indirectly for the improvement of the soil. I am sure a crop of oats will decrease the fertility of the soil; if you can put a crop of soy beans there and increase its fertility, you are that much better off, and I get more for the soy beans than I would from the oats.

A Member: What do you do with the soy bean straw?

MR. ANDERSON: If it is stacked soon enough and put where sheep can get at it, it works very well, but if it is stacked too late, it is not of much use except to apply as mulch. We set the thresher outside the barnyard and stack it in the barnyard and allow the cattle to run around it, and in that way we work it up pretty well; they get some food value out of it, perhaps not a whole lot.

A Member: Do you stack it in the barn?

MR. ANDERSON: I think I'd rather have them thresh it right away just as soon as it is fit.

A Member: We stack it in the barn and wait till the thresher comes around.

MR. ANDERSON: Well, you had the soy beans good and dry before you put them in; perhaps they cracked quite a good deal in threshing, did they not?

A Member: Yes, sir.

MR. ANDERSON: Well, that was due to their being dry. I like to have them threshed before they get too dry. Of course the cracked ones can be used for feed and we find that they analyze about three times as high in protein as wheat bran and quite as high as corn does, so they are worth something to you.

A Member: Have you spring corn sludgings for hay?

MR. ANDERSON: No, it pays me better for seed. I don't try many experiments that I do not think will pay me in dollars and cents.

A Member: We have to raise it more for hay than for seed.

MR. ANDERSON: Well, of course, conditions are what you have to be governed by.

A Member: You don't feed any cows, do you?

MR. ANDERSON: We feed ten cattle.

A Member: Do you use level culture for those potatoes?

MR. ANDERSON: Just as level as we can. In working potatoes you have got to throw some soil on the potato each time it is worked. I want that first working very deep; in that we throw quite a good deal of soil on it; then we take the smoothing harrow and go across the row. This year's crop of potatoes got that deep working two weeks ago. Then, after the first rain, we went across the row with a smoothing harrow. That is as far as we got till the present time, until the potatoes are large enough to cultivate we use the header.

A Member: Are your potatoes up yet?

MR. ANDERSON: They are not up enough to cultivate. As soon as they are large enough to cultivate, I want to cultivate them and fairly deep and then work right across with a header. After that the cultivation will be very shallow, getting shallow each time. We want to have as much of the seed bed available for plant growth as possible. The primary object of cultivation is to maintain a dust mulch over the surface and hold the moisture for the potato crop. Potatoes demand a whole lot of moisture if you are going to have a good crop, so it is essential to follow every rain by some sort of cultivation. It should be very deep the first time, fairly deep the second time and after that it gets shallower each time, stirring up the surface and that is all that is necessary to maintain a dust mulch, and that is the primary object of cultivation, to maintain a dust mulch and hold the moisture there for the growing plant.

A Member: Do you make that trench as deep as a plow?

MR. ANDERSON: Just as deep as we can with the shovel plow. We are bound to get into trouble in the way of tearing up corn stalks, for we use the disk ahead of the plow, but I find that we do not really tear up much with the shovel plow.

A Member: Does not clover winter-kill?

MR. ANDERSON: Yes, sir, but generally winter-kills in March and all through the winter it has been holding plant food available for the coming crop, it has been holding the soil for leeching; incidentally while it grew all fall it has been assimilating nitrogen from the earth, it has been increasing the fertility of the soil, and even if it does winter-kill, it has paid us very well. I do not care if crimson clover winter-kills with me every year, I would continue to produce the seed or buy them and apply it, because I know it pays me before it's winter-killed and pays me pretty well. I have seen results for too great a number of years that have been derived from the use of crimson clover and I am firmly convinced that it paid us and will pay every one who can grow it.

A Member: How do you store your seed?

MR. ANDERSON: Put them in the coolest cellar we can. That is about the best we can do. They should go in cold storage, but we get along without that. They should be stored in as cool a place as we can because there are so many diseases; that is another reason why we want to have our storage place as cool as we can get it.

A Member: Do you ever bury them?

MR. ANDERSON: No; it is practical to bury them if you bury them in a long, narrow kit.

A Member: Do you store those potatoes or keep them over?

MR. ANDERSON: If I can get what I consider a good price, they go right out of the field into a car; if prices are very low, as they were last fall, I store them. I didn't know what to do last fall; we sold some at thirty cents but quit that pretty soon; then they got to sixty cents and we sold some more, and I kept some till this spring and sold them for a dollar. If I can get a good fair price out of the field, I sell them right away.

A Member: And let the other fellow take the risk?

MR. ANDERSON: Yes, sir.

A Member: What do you call a fair price?

MR. ANDERSON: If I can get forty or fifty cents out of the field, I think I am making good money.

A Member: And you have more bushels out of the field?

MR. ANDERSON: Yes, you have more bushels out of the field, you get more little potatoes out and avoid the shrinkage, of course.

A Member: What do you call a profitable yield?

MR. ANDERSON: Well I think I ought to get a hundred dollars an acre out of a potato crop; we count on two hundred to two hundred and fifty if it is anything like a good season; sometimes we do not get it and sometimes we get more.

A Member: How do you harvest your soy beans?

MR. ANDERSON: With a grain binder, tie them up the same as wheat. We drive the binder in such a way that we only cut those two inches above the ground.

A Member: Are you bothered with the potato bug?

MR. ANDERSON: Yes, we have a good deal of trouble with the potato bug. There are several insects that are bother enough and I think the potato bug has caused more direct loss than anything we have, and the only way to take care of them is with some form of arsenic. Paris green is the most common. I think arsenate of lead is the best.

A Member: Do you put it in a dust or in water?

MR. ANDERSON: In water, sometimes Paris green is in a dust.

A Member: Do you use a spray?

MR. ANDERSON: Yes, sir, we use it in connection with the Bordeaux mixture. If I spray for bugs, I apply Bordeaux mixture with fungicide as well. We have not been troubled very much with early or late blight in that part of the country. If you are troubled with blight, those in the northern part of the State must spray of course, and the most practical spray to use is the Bordeaux mixture, possibly a four four fifty the first time or two and a five five or six fifty after the second spraying. That spraying should start when the plants are six inches high and be repeated after rains in periods of ten or fifteen days during the growing period. Spraying for blight is distinctly a preventive measure; you cannot stop it after you have it, you simply must spray before you have the blight and keep it out of the way; in that way you can get very good results, but once you have blight, there is no use spraying to control it because you cannot control it. You can prevent it by spraying, but you cannot control it in any way that I know of.

A Member: What has been your experience with the flea beetle?

MR. ANDERSON: The Bordeaux mixture has a tendency to drive him off into a neighbor's field.

The CHAIRMAN: It is a waste of time.

MR. ANDERSON: Well, perhaps it is. I like to spray for two or three objects, if it does not pay for one, it does for another; that is the only thing that will give us any benefit with the flea beetle, Bordeaux mixture; they do not seem to like it; some of them come back, but not all.

A Member: They are where you cannot reach them.

MR. ANDERSON: Yes; the flea beetle itself does not do so much damage, but it injures the plant and puts it in a condition subject to fungus troubles; that is where the flea beetle does its greatest damage. I do not think the flea beetle ever materially decreased the crop directly, but it has decreased the crop a great deal. I did not tell you how much arsenate we use; we find it necessary to use about twice as much arsenate of lead as Paris green. A pound of Paris green is sufficient and two and a half pounds of arsenate of lead is sufficient in fifty gallons of solution.

A Member: You have reference to the paste?

MR. ANDERSON: Yes, sir; if I were using the powdered arsenate of lead, I would apply it in the same proportion as Paris green. I can save time by using the arsenate of zinc; it is just as practical and it is cheaper.

A Member: At the present prices, it is cheaper?

MR. ANDERSON: It has been in the past. The other arsenates are a little bit higher but not anything like as much; if it's that much higher I wouldn't use them. In mixing that Bordeaux, you want to dilute your bluestone solution and you want to dilute your lime solution before you put the two together. If you do not do that, you will find that it won't stay in solution very well, and more than that, it will coagulate or clot and will stop up your strainers and stop up your nozzles and you will have all sorts of trouble. By putting half of your fifty gallons of water with your bluestone solution before mixing, then putting the two solutions in a common vessel in a dilute form, you won't have any troubles from that cause.

A Member: You say to mix a pound of arsenate of lead with one pound of Paris green?

MR. ANDERSON: Yes, two pounds of arsenate of lead paste will take the place of one pound of Paris green. Most people are in the habit of using Paris green. Two pounds of arsenate of lead paste to fifty gallons of water or one pound of Paris green or one pound of dry arsenate powder. You can get arsenate of lead in either form. Arsenate is as strong as Paris green, and should be used in the same amounts.

A Member: Does the arsenate of lead act quick enough to use?

MR. ANDERSON: It does not act quite as quickly as Paris green but it sticks better to the foliage and is not quite as injurious to the foliage as Paris green. You want to use more lime than you do your arsenate so as to take up the three arsenates in the solution; if you don't, you are going to have burnt foliage; that is the object, of course, of the lime in the Bordeaux, the arsenate is the active agent. Are there any other questions about the spraying?

A Member: How do you find the powdered arsenate of lead compared with the paste for standing up in the solution?

MR. ANDERSON: Well, now, I have only used the powdered arsenate of lead this year; I used one can in spraying the orchard and I had very good results with it; it is less trouble to put in the mixture.

A Member: It stands up in the solution better than the paste?

MR. ANDERSON: I should think it would quite as well; I don't know whether it does better or not.

A Member: I think it stands in the solution better.

MR. ANDERSON: I am glad it does because it is a little cheaper than the paste form and more convenient to use. If it will stand in solution better, it will be better to use. I did not disk all the ground this year, but I did disk a good deal of it. I am sure it is practical to work the sod up; if you don't, you turn over a mass of matter there which will stop the rise of the moisture from the subsoil where it is of no use to the growing plant. If you work that up and incorporate it with the surface soil before turning it over, you get a good connection between your soil and subsoil and have conditions favorable to the rise of moisture to where your plant roots are. I don't know just where we are in this potato proposition. Perhaps we have killed enough time anyhow.

I want to repeat in conclusion, a few of what I consider the essentials in successful potato growing. I want to say that we can do the farmers of Pennsylvania a whole lot of good in going out to the Farmers' Institutes and impress upon them as forcibly as we possibly can the necessity of plenty of vegetable matter in the soil; and then we want to impress upon them the necessity of hill selection of seed potato.

Another thing that I think is very essential is that first deep cultivation; I think it pays us as well as any other feature; and another thing which I think is absolutely essential is cultivation after rains during the growing period to conserve the moisture during the growing period. We have a farmer down in our country who is President of the Board of Directors of our Fair Association and a pretty good farmer; that fellow can beat me growing corn almost every year and I can beat him growing potatoes every year. It does not follow that his soil is any better adapted to growing corn than mine or that mine is better adapted to growing potatoes than his, but I tell you where the secret of the proposition is: That fellow thinks that corn pays him better than any crop he grows and I have been under the impression that potatoes pay me better than any other, and just as soon as my soil is in condition to cultivate, I cultivate potatoes first, and as soon as his soil is in condition to cultivate, he cultivates corn first, so he beats me growing corn and I beat him growing potatoes.

The CHAIRMAN: Now we want to dismiss in ten minutes; in five minutes more we will leave this room and the automobiles will be outside. I want to call on Henry Crumley, who will occupy ten minutes of your time and then we will dismiss.

MR. CRUMLEY: Mr. Chairman, Ladies and Fellow Farmers: I say fellow farmers because I am a farmer myself. Until about ten weeks ago I lived on and operated a farm at Plymouth, Sheboygan county, Wisconsin, on which I was born. Ten years before I was born, not a single white man lived in that town; it was a perfect wilderness. Like many of the other farmers in Sheboygan county, my principal income was derived from the milk hauled to the cheese factory to be made into cheese. I am glad of this opportunity to talk to you for a few minutes in order to impress upon your farmers of this State the need of co-operation in disposing of your farm products. I happen to be the President of and organized the Sheboygan County Cheese Producers Federation in Wisconsin, composed of over one thousand farmers, forty-four cheese factories. The output of these forty-four cheese factories is over one million pounds a month during the flush of the season. I am sorry that I have not got time to tell you the whole story, the story of how the farmers of Sheboygan county combined to bust the Cheese Trust in Wisconsin. It is a story of how the farmers can, if they want to, bust a Trust without putting anyone in jail. Because I have only a few minutes, I cannot tell this story to make it plain enough to you, I am afraid, so I will just glance over the facts.

Now the story of this fight on the cheese combination in Wisconsin has been published in many of the farm journals throughout the country and some of the magazines also. I want to call your attention to this fact, that several weeks ago, before I left Wisconsin, Mr. James H. Collins, of the Saturday Evening Post, spent a day with me in order to get material for writing this up, and within the next two weeks you will probably see a write-up about this fight showing how the farmers have benefited themselves by co-operation in—in the Country Gentleman, which is published by the Saturday Evening Post Company, I hold in my hand an article taken from LaFollett's Magazine in Wisconsin telling the story of the fight on the Cheese Trust. If there are any farmers interested enough within the next two weeks, just drop me a line, Henry Crumley, Plymouth, Wisconsin, enclosing four cents in stamps, and we will mail to you this booklet telling all about it, which is better than I can tell you now. It may interest you also to know that more cheese is produced in Wisconsin than is produced in all the other states in the Union combined. Sheboygan county, the county I came from, is the banner cheese producing county in Wisconsin and Wisconsin is the banner cheese producing state in the Union.

As I told you before, like most of the other farmers in the county, my principal income was derived from the milk hauled to the cheese factory to be made into cheese. What we farmers get for our cheese is of great importance to us. How has it been going with us? For years we allowed the cheese-maker to whom we paid a certain sum per pound to make our milk into cheese, to sell our cheese for us; we paid him, say, a cent and three-quarters a pound for making and selling. Now he got that cent and three-quarters whether he sold that cheese for a high price or a low price. Of course he guaranteed to get us the market price for our cheese, but the market price was the Board price. You have all heard probably of the Elgin Butter Board. The Plymouth Cheese Board is for cheese what the Elgin Butter Board is for butter, it fixes the price at which the producer must sell his cheese all over that state and beyond that state; in fact it fixes the price on cheese for all Western New York, from there to the Pacific Ocean and from Lake Superior to the Gulf of Mexico. In the spring these cheese producers would have a meeting and make a bargain with their cheese-maker and he would agree to make their cheese for a cent and three-quarters and get them the market price which was the Board price, but we allowed the cheese dealers to run that Board to suit themselves. Now up to the spring of 1911 there was some competition in buying on that Board, but about that time there was organized and incorporated the Wisconsin Cheese Dealers' Association, and beginning at that time the price was arbitrarily made regardless of supply and demand; that is it was made low during the season of production and during the season of production the cold storages were filled up and in the winter that Board price was run up and the cheese was unloaded, they shipped cheese out by the train-load, and cheese that we, during that year, got 11 to 13 cents for, bringing our milk as low as 80 cents a hundred, which is less than 2 cents a quart, cost the consumer, when it reached him, 25 to 30 cents a pound.

Now it is a fact that in this country, according to the information we get from our Department of Agriculture, that when a consumer buys farm products, $1. worth of farm products, that the farmer gets only 48 cents of that, or about that; in countries where the farmers co-operate scientifically, like Denmark, Germany, England and Ireland, the farmers get as high as 90 cents, I am told, of every dollar, in some instances. As I told you, we got 11 to 13 cents for our milk, bringing our milk sometimes as low as 80 cents a hundred, and this cheese was shipped out during the winter, when they unloaded what they had in cold storage at a price as high as 18 to 22 cents a pound, and local dealers there cleared up in one year fifteen to fifty thousand dollars apiece. That went on about a year. In the spring of 1912, after they got rid of what they had in storage, they dropped that Board price as low as 15 cents, which it was on Board day, May 21, 1912. On the next Board day, May 28, when there was a demand for cheese at 15 cents which could not be supplied, they dropped that Board price to 12 cents, and it was then that I wrote and I happened to be at that time a State Senator in Wisconsin and also Chairman of the Republican State Central Committee. That has nothing to do with this, only this, that what I said would perhaps be listened to more than if I were just an ordinary farmer, as I actually was, but I wrote an article for the press charging this Wisconsin Cheese Dealers' Association—you remember this was a closed Board, the dealers had the say as to who could bid on the cheese—I wrote an article for the press and sent it to 150 newspapers in Wisconsin, charging them with arbitrarily fixing the Board price, with having the special privilege of storing cheese in the cold storage, with paying the cheese maker who acted as our agent a bonus price on the quiet, on the sly. I called the attention of the State Board of Public Affairs, of which the Governor is Chairman, to these conditions, and asked them to investigate the matter. They did so and had a hearing in the Governor's office in July, 1912. I invited myself to attend, because dealers, cheese-packers, members of the Wisconsin Cheese Dealers' Association were all there and I was asked to make my charges and the members of this combination were questioned by the different members of the Board of Public Affairs which is composed of prominent men throughout Wisconsin, headed by the Governor, and every charge that I made they admitted was true. This combination admitted that they had a secret meeting before the Board met to agree upon the price to be paid; they admitted that the output from the different factories was allotted among the different dealers; that they had the special privilege of storing in cold storage—

The CHAIRMAN: Your time is up.

MR. CRUMLEY: I am sorry that my time is up. Just allow me to make this statement: The farmers co-operated, formed a local association and these forty-four local associations formed a county federation. This county federation built its own warehouse and storage, costing $25,000, and we are now marketing monthly over a million pounds of cheese which goes directly from the farmer to the wholesale grocer at less expense than a quarter of a cent a pound. You talk about efficiency—there is efficiency for you, and we have busted the cheese trust in Wisconsin. (Applause.)

THE PENNSYLVANIA HIGHWAY SYSTEM

By W. D. UHLER, *Chief Engineer, Pennsylvania State Highway Department.*

Mr. Chairman, Ladies and Gentlemen: I appreciate the opportunity of appearing before this Institute and telling you citizens and taxpayers about a few of the many problems confronting the Pennsylvania State Highway Department in its work.

When the State Highway Department was reorganized in 1911, the original plan was to lay out a State Highway System which would connect the county seats in the State by means of the most traveled and most direct roads. This laudable intention was frustrated, in a measure, by the desire of various communities to have greater mileage in their localities added to this State Highway System; the net result being that the Sproul Act, under which the State Highway System was designated provided for 8,800 miles being taken over by the Commonwealth. This was far too much. Notwithstanding this fact, the Legislature of 1913 added more than 1,400 miles to the system. Had it not been for the firm stand taken by Governor Brumbaugh the 1915 Legislature would have continued to increase this mileage by adding routes to the Sproul System.

This vast mileage falls on the State to maintain and reconstruct. From the viewpoint of highway efficiency the system, as constituted, makes for Pennsylvania's greatest mistake. No other state in the Union has attempted the control of so great a road mileage. Rather, the practice has been to take over those highways which have been reconstructed with a permanent type of road material and to assume no responsibility for their maintenance prior to that time. Far better would it have been for Pennsylvania had a main line system of roadways been adopted directly connecting the county seats and following the main courses of travel east and west and north and south. This would have meant a State Highway System not exceeding 3,300 miles, which would have been feasible and comparatively easy to maintain with the revenues at the disposal of the Commonwealth for highway purposes.

At the present time the Department is working up such a comprehensive plan of main arteries. It is proposed to secure, if possible, the approval of Governor Brumbaugh to this plan, in which event, all permanent improvements in the future will be limited to this main system until it is completed, after which the laterals will be improved from time to time as appropriations become available.

This, however, does not mean that while the main arterial system is being constructed the balance of the road mileage would be neglected. It would still be our aim to maintain the balance of the mileage in good passable condition until such time as it becomes possible to construct the entire system.

In taking over and assuming the responsibility of 10,200 miles comprising the system, only a small percentage of which was improved, the State shouldered a burden too great to be carried in a proper manner. To demonstrate the wisdom of the policy adopted in other states, I would call your attention to the fact that the Pennsylvania State Highay Department during 1915 spent approximately four and one-half million dollars in maintaining the present system of 10,200 miles and, from present indications, will spend during the year 1916 for the same purpose approximately three million dollars, making a total expenditure of seven and one-half million dollars in two years with nothing of any great moment in the way of permanency to show for it.

In this connection it might be well to call your attention to the fact that the Legislature appropriated for the use of our Department $8,300,000 for the years 1915 and 1916 as follows:—

$1,500,000 to pay the State's indebtedness to the townships under what is known as the Township Road Law, providing for a cash tax bonus; $250,000 for the purchase of toll roads; $500,000 for State-aid work; $50,000 for the improvement of the National Pike; $6,000,000 for the maintenance and construction of State highways; which gives us $3,000,000 a year for maintenance and construction work. In addition to this, we had the automobile receipts up to June

1, 1915, which gave us an additional $1,500,000 for maintenance work, or a total of $4,500,000 for 1915. Due to a proviso in the appropriation bill, reading that this was inclusive of and not in addition to the revenues derived from the receipts from automobile licenses, this money now goes into the general fund and does not come direct to the State Highway Department for its use. This means that this year we will have available only $3,000,000 for maintenance and construction work, or in other words, one-third less money this year than last, with far greater demands, together with a large increase in cost of material and labor, which cannot help but greatly handicap the work of the Department during the present season. It is hoped that a portion of this added burden may be overcome by the increased efficiency of our working organization. The three million dollars available for this year's work in itself seems large, but when divided by 10,200, which represents the number of miles of road in the State Highway System, it means less than $300 a mile. This shows plainly that very little new construction work can be undertaken.

I would like to offer for your consideration the advisability of you citizens and taxpayers taking up with your Representatives the question of appropriating to this Department the automobile receipts accruing during the present year, and to urge the enactment of such legislation as to turn the automobile revenues in the future over to the State Highway Department for use in the maintenance of its roads. If this were done, the amount derived from automobile licenses, including the natural increase in the number of licenses issued, would be sufficient to maintain our State Highway System, as now laid out, or as may be constructed, if proper attention is paid to the construction end of the work, so that the State's revenues would be called upon only to provide the means for constructing the system. The Department is in hopes that the coming Legislature can be prevailed upon to make a fixed appropriation of from three to five million dollars a year for the years 1917 and 1918 for construction purposes, which would enable us to start construction and carry the work on until the time the bond issue will be presented to you again for your approval, or disapproval. Never lose sight of the fact that you cannot build good roads without money.

The work done during 1915 was the maintenance of 6,648 miles of earth, flint, gravel and shale roads; resurfacing 525 miles of water-bound macadam roads; oiling 1,084 miles of roads and maintaining 1,355 miles of stone and other improved roads. These figures show conclusively that the method under which we are working is by far the most expensive way to build up a road system. Had it been possible to expend this seven and one-half million dollars in permanent construction, from five to six hundred miles of highways would have been improved during the working seasons of 1915 and 1916, which, added to the 1,880 miles of road already improved, would have furnished a nucleus for the permanent highway system of the State.

You have heard about the much-heralded Maryland highways. Did you ever stop to think that this system, as now constructed, consists of 1,035 miles with a total expenditure of approximately $17,000,000. Pennsylvania, today, as above stated, has approximately 2,000 miles of improved roads in its system, but it is not connected and, therefore, makes no showing such as the Maryland System, which runs from one end of the State to the other.

I might add that it is the policy of this administration to maintain the present road mileage in Pennsylvania before attempting any new construction work. We have a large mileage of old State-aid roads together with toll roads taken over which require resurfacing in order to save what little is left of the original improvement, so that, as before stated, the work done during the seasons of 1915 and 1916 primarily has been and will be that of maintenance. The general practice in handling the various types of roads is as follows: Earth roads, to provide the shape and contour by the liberal use of log drags; water-bound macadam roads, to resurface and patch where necessary and then to preserve this surface by the use of a bituminous surface treatment; brick, asphalt, concrete, etc., to make such repairs as may be necessary to keep the road in good condition.

After all improved surfaced roads have been repaired, they are taken care of under the patrol system which has been inaugurated in the Department. This provides for the placing of caretakers or patrolmen in charge of sections of highway from three to five miles in length depending upon the character of the road to be maintained. Each patrolman is provided with tools, material and equipment necessary to take care of his section of road properly. This method has been found to be not only more satisfactory but also more economical than any other devised for the maintenance of highways.

There is no doubt but that the problems of the Pennsylvania State Highway Department have been greatly complicated by the character of the roads unloaded, as it were, upon the State. In a number of cases roads which had been neglected for years and, in some instances, abandoned roads were deliberately bequeathed to the State. As an illustration of this, let me cite one section where five routes, leading north from one of the east and west main highways, were laid down within a distance of twenty miles. One route, twenty-four miles in length, is not open to traffic at the present time, as a portion of it runs over what is left of the right of way of an abandoned narrow gauge railroad, the graded roadbed of which, for a greater portion of the distance, is not more than five feet in width. The rest of the location of this State highway follows old lumber trails which it would be necessary to re-locate and grade.

The second route runs along the Susquehanna River. It should be, and undoubtedly was, a very important thoroughfare to the northwest, but when the railroad was built along the river, the right of way of the highway disappeared. To put a road of sufficient width in this location at the present time would require either the construction of a retaining wall along the river, nearly the entire length of the road, or heavy grading to place the highway between the railroad and the mountain side, as high bluffs are encountered along the whole line. In either event, this would mean an expenditure of at least twenty or thirty thousand dollars a mile exclusive of road surfacing.

The third State highway, in the locality to which I refer, is an historic one which virtually has been abandoned by the local authorities for the past generation. The right of way is covered with underbrush and but little remains to indicate that it once was a prosperous and much traveled highway to the frontier.

Of the fourth State highway, running off from this east and west trunk line, only a short distance is safe for traffic. The railroad built through here forced the re-location of this highway. In many places it was thrown up on the side hill to permit the railroad company the use of the original location. At several points the road now is not more than nine or ten feet in width, with almost precipitous slopes.

The fifth of these highways is the only one that can be put in passable condition at a small expense.

These examples simply serve to illustrate one of the many problems confronting the Department. Of these five roads only one would be used in a main system of highways.

The toll road is another problem to be considered. At the time the Sproul Act was passed there were 717 miles of toll roads in Pennsylvania, of which 521 miles were taken into the State Highway System. Since that time 105 miles of these roads have been acquired by the State Highway Department through purchase, leaving 416 miles still on State Highway routes, the major portion of them being in thickly populated and heavily traveled sections of the State. The toll roads, as originally built, were of great benefit in the early development of the State, but today one looks upon them as a relic of the dark ages. They are an anachronism! Nevertheless, this subject is one that must be reckoned with and the expenditure of large sums will be necessary before all the toll roads are acquired finally by the State.

We should not lose sight of the fact that the improvement of our State Highways adjoining these toll roads enhances the value of this form of private property and means a consequent increase in the price which the owners demand when the State gets ready to take them over. Most of the toll roads remaining in Pennsylvania are located in the southeastern corner of the State, forming a network of highways in and about Philadelphia, Lancaster, Lebanon and York.

By far the most important problem in connection with the development of an up-to-date State Highway System is in securing or providing revenues sufficient to permit of the construction of a main arterial system such as I have outlined previously. Whether such funds are to be derived through taxation or by a bond issue is a question to be decided by the public through the Legislature.

Another problem which causes us great concern is that of the maintenance of bridges on State Highway routes. The law provides, or at least so it is interpreted, that all county built bridges on routes are to be maintained by the county authorities, and all bridges built or maintained by and at the expense of townships are to be taken over by the State. This means that in many instances the county authorities neglect the maintenance of the bridges on the routes taken over by the State and the State is powerless to compel them to make the necessary repairs. The traveling public, however, not knowing the facts, naturally blames the Department for such conditions. In a number of cases the State Highway Department has notified county authorities of the dangerous condition of certain bridges, but has been met either with a refusal to make the repairs or has received no reply whatsoever.

The State Highway Department, of course, has the usual troubles and problems as to the types of road to be built. It is impossible to satisfy everyone, but the invariable rule of the Department is to consider carefully the local needs and conditions, together with the traffic, grade, original cost and maintenance charges, before making any decision as to the type to be selected. It is my personal opinion that the time has come when maintenance should be the principal governing factor, as in the construction of such a system of highways as is planned by this State, maintenance will be the first item to be reckoned with. There is no doubt but that in the past insufficient attention has been given to the selection of the type of pavement suitable for local conditions.

Allowance must and should be made in the selection of the type of pavement for a constant increase and change in the character of the traffic. The type that made France famous for its good roads, water-bound macadam, as originally constructed and maintained, will not meet the present day traffic demands of the motor vehicles.

Since the advent of motor vehicles, still further demands are made by the constantly increasing size and weight of motor trucks now being used, which creates an entirely new condition. There is no question but that either steps will have to be taken in the near future to control this class of traffic, or else additional revenues must be raised to permit of more permanent types of construction, as the roads built in the past, in the majority of cases, are neither of sufficient width to permit the safe operation at high speed of the trucks, as now constructed, with bodies practically the size of freight cars, nor are the foundations sufficient to carry these excessive loads.

The State at the present time derives no revenues from this class of vehicles other than the regular motor license fee of from five to twenty-five dollars a year, depending upon the size of the truck. This is another question that must be settled by the public through their legislative body.

The question of experienced help, including engineers, superintendents, foremen and even laborers, is a problem confronting us at every turn. We have found it impossible to get sufficient skilled assistants for the reason that road work, along modern lines, is in its infancy. It is necessary to educate the forces and one of the chief troubles in holding together the necessary road organization is, that it is impossible, in fact, impracticable, to provide work for them during the full twelve months of the year. This is because the character of the work will not permit of continuous employment and it becomes necessary, usually, to lay off approximately seventy-five per cent. of the force at the close of the working season. This means that the skilled assistants and good laborers look for work of a more permanent character. Again, in certain parts of the State, we have found it impossible to secure any kind of labor and this, of necessity, makes necessary the importation of foreign labor with all of its drawbacks.

In this connection, I would like to ask the co-operation of all the citizens of this State. If you see anything wrong with the work of any of our men, notify the Department, giving us an opportunity to correct the errors before you start criticism. If you will stop to consider that during the height of our working season last year we had approximately 10,000 men on our pay-roll, you can see plainly that with such a large force it stands to reason we are bound to have some weak links, and it takes time to find them. It is your money that is being expended, and we feel that you should at least co-operate with us to the extent of calling our attention to anything that you may notice, as it is one of the policies of the Department to investigate every complaint that is received. The only thing we ask is that if you do make a complaint, give us full details, and I assure you that the subject will be investigated and such action taken as the case may warrant.

In conclusion, aside from the actual building and maintaining of roads, still another and a very vital question is the proper administration of the affairs of the Department. Too often has it been the case in public office in this country that political preferment has been exercised to so great an extent that efficiency has been impaired. In appointing the late Commissioner Cunningham, Governor Brumbaugh gave him to understand fully that he expected a businesslike administration of the State Highway Department, efficiency as the first consideration. Removals, promotions and appointments in both the Engineering and Executive Divisions have been made solely upon merit. The result is that today Pennsylvania has an efficient and an economically-operated State Highway Department.

Mr. Uhler followed his address with a sterioptican talk, as follows:

This slide shows our organization as in effect at the present time, consisting of a Commissioner, First Deputy Commissioner, in charge of Township Highways, Second Deputy, in charge of Maintenance, Chief Engineer and fifteen Assistant Engineers. The State is divided into fifteen districts. Under the engineers we have fifty county superintendents who are supposed to look after the details of the work, and in addition to that we have the engineers and draughtsmen, clerks, etc., to handle the business of the Department. This represents the present system of State Highways, consisting of 10,200 miles of road. As you will notice, in some sections of the State, they are pretty thick. This (map) is a proposed scheme that we are working on now with reference to a main arterial system. This does not necessarily mean that it is the scheme that will be finally put up to the Governor, but it connects all the county seats in the State, takes care of all the main east and west, north and south routes, and will consist of approximately 3,200 miles of road, of which 1,100 or 1,200 miles are now completed, our main idea being that the main arterial system should be first completed and then the others.

I spoke of a number of roads being unloaded on the State. The first type is a narrow gauge road and lumber trail; the second is practically taken up by a railroad company; the third is practically closed to traffic; No. 266, running from Jersey Shore up to Slate Run the greater portion is not safe for traffic. That was re-located by the railroad and in some sections is 100 or 150 feet above the railroad and 5 to 10 feet in width. The next road, No. 353, is in passable condition and can be put in good shape at very slight expense. This slide shows a picture taken on the road from Jersey Shore to Slate Run. That is only 5 feet in width at that point and 150 feet above the railroad; we had a slide there. This shows the method we have of keeping a record in the office of the contracts while the work is under way. This is a sample of the roads in one of our western counties, which we inherited; not much of it left. This is another one of our roads that we inherited. It came into our possession June 1, last year; it is the additional 1,400 miles given us by the session of 1913. This is another one of the roads that came over to us last year; it was an abandoned pike, had been closed to traffic for several years. The counties and township authorities did nothing on it. That is another photograph taken on the same road. It indicates that there couldn't have been any work done on it for a considerable period of time. This is another one of the 1913 roads that came over to us last year. That is another illustration. That is another road, in fairly passable condition. That is another road out in the western part of the State— slides and no work been done on it, they told us, for a period of at least 8 or 9 years.

That is a sample of one of the many bridges which came over with some of these routes; it shows the different pipes and methods of construction. That is another style of construction. There is another one, a little bit better, although that is simply built out of two inch plank. That is another type; it simply illustrates the problem we have ahead of us with reference to the reconstruction of the bridges alone. There is a good example of wasted energy and material; if that had all been put into a bridge, they might have had a fairly decent structure. That is another type. That is not so bad. That is another type of construction. That is still another one. That is still another type. That is simply a little gully left through there and I think I have a picture that shows that reconstruction. That is the same location with a new culvert. That is a picture taken up near Erie on the Mill Creek road. It shows the effect of the flood last year, which cost the Department approximately $300,000. not only in Erie county but all through the State. There is a picture taken of the Erie flood, showing the conditions right in Erie. That is one of our roads up in the northwestern section of the State; they need ferries there. That is another one of our roads up in the northwestern section of the State. That means a problem to correct the drainage as well as raising the roads when we come to re-build them.

Now this represents the re-location of one of our roads. This lower line represents the old road down in the bottom which floods two or three times a year, and this upper line the re-location along the foot of the mountain. That is one of the roads reconstructed by the Department showing a re-location eliminating two bridges that was flooded at certain seasons of the year. We threw that up on the higher ground as well as doing away with two bridges which you will notice on the left. That is a picture of the same road showing one of the bridges, and shows the re-location coming in at a higher elevation. That is another one of the same roads showing the construction of the standard guard rail, also the rubble gutter as well as macadam road surface. That is a picture of how not to make repairs, taken last year on one of the local roads. That is a picture taken up in the northeastern section of the State, showing the way a dirt road is worked up by a road machine and left for traffic. We do not advocate that type of work. That is a picture showing a tunnel in the northeastern section of the State, showing conditions last year where they were doing some work on one of the township roads. That represents an earth road being worked up with a road machine; it shows what can be done with an earth road if properly handled. That shows the material being brought into the center of the road. That is the road completed, shaped up and dragged. That is another earth road and shows what can be done if the log drag is used consistently and properly. That is another picture of the earth road fixed with the drag. That is a section of the highway leading into Erie just outside of the city limits; it shows the condition prior to reconstruction. That is one of the roads in the central section of the State prior to reconstruction, showing the narrow roadway. That is the same road re-built, with a water-bound macadam construction, however. That is a borough up in the northern tier of counties, Wellsburg, before improvement. It looks as though it badly needed some improvement. That is the work after it was completed—brick street. That is another one of the roads prior to improvement; that is the road after improvement. That is another one of the roads before improvement; that is the same road after improvement. That is one of the little boroughs up in the northern part of the State before improvement; you notice they have the material on the side ready to go ahead with the work; it shows that it is badly needed. That is another one of the outlying sections of a borough before improvement; brick on the ground ready to go ahead. That is a picture taken in one of the little boroughs up in the central section of Pennsylvania; it shows the road blocked off to traffic, impassable. That is a reconstructed highway showing a bridge, of bituminous construction, standard form of bridge, as contructed by the Department together with guard rail protection. That shows a standard watering trough which we place along some of our more important roads, especially where there is considerable horse-drawn traffic. That is a view taken on the Lincoln highway, showing the general effect of the highway, the way it winds around the side of the mountain. That is a road up in Blair county before improvement; that is the same road with a concrete base, laid with concrete headers, being completed.

A Member: What was the cost of repairing that road?

MR. UHLER: I think that road cost about $20,000 a mile; it had very heavy grading on it, exceptionally heavy grading; that is the Buckhorn road.

A Member: Is it possible to arrange that road so that farmers or people can use their horses on it?

MR. UHLER: I am sorry to say that that type of construction should never have been used on the grades that are on that road.

A Member: Is there any method to remedy it?

MR. UHLER: Only to widen out the shoulders and put some additional stones on to make it passable at all seasons of the year. The road surface itself I do not think you can do anything to it to prevent that slipperyness.

A Member: I had about a dozen horses ruined on it and had to quit hauling on it.

MR. UHLER: I would like to say that the policy of our Department is not to build that type of road on grades in excess of four to five per cent.; we will not allow bituminous construction to go on roads with that grade.

A Member: It is one of the best built roads I ever saw.

MR. UHLER: You are absolutely right on that. You can take a 4% to 7% grade with concrete or brick or water-bound macadam all right, but with present day traffic it is necessary to use oil to hold the road and you create the same slippery condition as if you built a concrete road. For water-bound macadam construction the average price is $11,000 to $13,000 a mile according to the grading. That is the same road material, that is what we term an asphaltic concrete, a mixture of stone and sand and asphalt.

A Member: It is one of the most substantial roads I ever saw; it is just as good today as when it was built, it is not worn a bit; there is no question about its usefulness.

MR. UHLER: Durability, not usefulness.

A Member: That's what I mean.

MR. UHLER: That is a picture of the same road showing the guard rail construction along the side of the mountain. That is a picture before we started construction on what is known as the Easton and Allentown road. We are building there a concrete roadway. The cement interests in the Lehigh Valley donated 40,000 barrels of cement toward this road and the local people donated the stone; the State is furnishing the labor for the grading and the sand and is doing the work. This is the same road, showing the installation of under-drainage prior to putting down our concrete surface. This is a wet place. In handling this work we availed ourselves of the trolley road which paralleled the road from Bethlehem to Easton, and got all our material hauled by trolley for 16 cents a ton irrespective of distance. That shows the material scattered on the subgrade. The cement is put in the little houses built of canvass, in piles, and the reinforcement. That shows the work in progress, dumping the concrete; that shows the steel side forms and reinforcement. On that road we are using a light metal reinforcement, placed two inches from the top in order to reduce the number of cracks.

A Member: What is that? Expanded metal?

MR. UHLER: Yes. That is another picture showing the joint installed as well as the reinforcement. That shows the striking off; we used two tenplates for striking off and mulching down the surface. That shows the men floating. That shows a man finishing the joint with a split float.

A Member: What is the width of the concrete surface?

MR. UHLER: Sixteen feet. The length of the road when completed will be approximately 9 miles. That represents a closer view of a man finishing a joint with a split float. That material sticking up in the middle of the road is the expansion material. That shows the edges at the joints. Instead of using a steel-protected joint, we are simply finishing off the joints, that is rounding off the outside edge of the road to prevent chipping. Those joints are about 39 feet, 6 inches. That is a completed section of the road prior to covering with earth; for curing those the expansion joint projected above the surface of the road. That is the road after it has been cured, and we are cleaning off the dirt. That is the completed roadway after the dirt has been cleaned off and the road has been opened up to traffic. We usually keep it closed 14 to 18 days after the concrete is laid before we allow traffic to go on it. That shows the method used in California in curing their concrete roads. Instead of covering them with dirt, they simply have a ponding method, they have an adobe soil there which is impervious and they throw up this little dump and fill it with water. That represents the effect of traction engine traffic on a bituminous road from the cleats on some of the engines.

That shows the character of traffic that roads are called on to carry after they are improved. That shows the effect of automobile traffic, motor traffic on a water-bound macadam road; all the fine materials ripped out. That is another one showing the effect of motor traffic. That is another picture showing the effect of motor traffic on water-bound macadam. That shows sweeping water-bound macadam prior to treatment with oil. That shows machine broom sweeping; that is cleaning up after the machine broom has gone over it and they are cleaning the balance of the material off with a hand broom. That is the old method of applying oil. That is the first oil wagon in the State several years ago; this is a new method of applying oil with a motor pressure distributor. That is the road after the oil is applied before the chips are spread on the road. That is the road being covered with chips to prevent traffic from picking up the oil. That is a treated road, that was under traffic for about 30 days. That is another treated road up in the northwestern section of the State, treated with asphaltic material. At the same time it shows the manner in which we are trying to treat our State highways with white-washing; on our important highways we are aiming to whitewash the telephone poles and all the objects projecting, which is a big help to the travelling public at night; it makes it look as though someone was on the job. That is another treated road with guard rail and telephone poles whitewashed. That is a shale road treated with simply a dust layer up in the northeastern section of the State; we utilize asphaltic oil to lay the dust. That is another treated road. That is another treated road with dust laying oil. Thank you, gentlemen, for your attention. (Applause.)

A Member: Where a county is deprived of the automobile taxes and the cash road tax, a county containing numerous towns where millions of dollars are paid out every day to the employees who are suffering for the necessaries of life because the farmers cannot get into them, and the farmers are suffering because they cannot get in on the county roads, what is the remedy—where you are building these arteries for boulevards?

MR. UHLER: Well, the only remedy I see is a question of funds. The Department is absolutely helpless. As far as building these main arteries, if we were to undertake that system, we would have to keep those other roads up.

A Member: What are we going to do locally to get into our market towns while you are building those roads? I live on the State line between Pennsylvania and Ohio; Ohio is willing to meet the Pennsylvania people and build half the road, but that cannot be done, and near Sharon, where I live, the roads are utterly impassable. Potatoes were being shipped from Ferndale, from Bird Hill and Kinsman, bought at 30 cents a bushel, and the farmers realized that it was going to be too late, they'd have to cart them out and put them in the fields, while potatoes had a ready sale at a dollar in Sharon; the consumer and producer were both suffering; what is the remedy?

MR. UHLER: To get sufficient means to improve your main roads, we feel that it is going to take considerable time for the State to raise the revenue to build this entire mileage of 10,200 miles; we feel that the local authorities should help out and co-operate, that they should provide means, should meet us half-way in building the roads. To build the 10,200 miles of road is out of the question; that cannot be done for a period of at least 10 or 15 years.

A Member: We feel that we need the local roads more than the main arteries.

MR. UHLER: Well, the main arteries I have in mind is with a view of market roads, to take care of your main locations. The road you have reference to, is that on the State highway?

A Member: From all these points north into Sharon.

MR. UHLER: If it is not a State highway route, by applying you can get State aid.

A Member: All the arteries lead into Sharon from the State line road.

MR. UHLER: If they are not on the State highway route, the county, if they will raise an equivalent amount of money, can get State aid to the extent of 50%. The last Legislature appropriated $500,000 for highway construction; that can only be expended on the roads which are not on State highway routes.

A Member: Do I understand you to ask the local people to bear one-half the expense of State highways?

MR. UHLER: I think that is the thing to do if you want to get a system at an early date. You are the people benefited by it. We have several instances where the local people have agreed to pay 50% of the cost of construction on our State highways. We have an application from Cambria county in which they pledge themselves to pay 50% of the cost of construction of 10 miles of road on the State highway. We have another between Pittsburgh and Washington. We are working on a road in Chester and Delaware counties where the local people have pledged themselves for $70,000, and other schemes whereby the local people will pay half the cost to get the roads at an early date.

A Member: While the State has approximately 10,000 miles, the local people have 90,000 to take care of; it is a wonderful burden on the local people.

MR. UHLER: Yes, it is a larger problem than the average citizen thinks it is. Of course the State has got the more important roads in all the communities. It is altogether a case of legislation and a case of money.

A Member: Whose fault was it that the State inherited so many poor roads?

MR. UHLER: All I can say is that these routes are laid down by legislative enactment. I am not here to blame anybody. The roads are here; as the Governor says, it is not a theory, we have them and have got to do the best we can with them.

The CHAIRMAN: What interested me particularly was the illustrations you show of roads abandoned for all these years, nobody travelled over them, there was virtually no road there, and the question comes in my mind, what have those people done? They have not gone over these roads. I think the State is taking over highways that nobody requires to travel on—that is the way it would look from the illustrations shown.

MR. UHLER: I assure you that we get as many complaints from those roads as any others about their condition.

The CHAIRMAN: But roads 5 feet wide and along the great mountain sides where apparently there is nobody living, abandoned since the lumber was taken out of the country.

MR. UHLER: That is why I stated that in my opinion the State went about it in a wrong way in laying out the present system, they should not have taken over the responsibility of maintaining these roads.

The CHAIRMAN: Some industrious member of the Legislature wanted to show his people that he got roads; that is about it.

A Member: Have you ever, as yet, anywhere in the State, tried this method out thoroughly? Say we used the split log drag as soon as the frost goes out in the spring time and used it frequently during the summer time to keep that road in good shape, free from ruts, etc., and keep it going until freezing; have you ever done that?

MR. UHLER: We have been advocating that and trying to get our men to do it right along. I think that is the only way to handle a dirt road, to keep at it with a log drag.

A Member: I would like to see it demonstrated somewhere in the State.

MR. UHLER: You cannot help getting good results with that method.

A Member: We had a demonstration in our county that was absolutely satisfactory.

MR. UHLER: It cannot help be satisfactory. (Applause).

NATIONAL ROAD CONSTRUCTION

By HON. HENRY A. BARNHART, *Member of Congress, Committee on Roads*

Mr. Chairman, Ladies and Gentlemen: Your Chairman introduced me by saying that I would talk on National Road Construction and legislation particularly. I am going to change that word particularly to incidentally. My good friend, Mr. Patton, with whom I had the pleasure to serve in Congress and with whom I lived at the same hotel for several years, has several times invited me to come to Pennsylvania and deliver a talk, and I am going to introduce myself by saying to you that I have spent most of my years on a farm and in the farming business, although I have been incidentally in some other things in a business way. And I might say further that I never made a public address until I was almost 50 years old, so you will not expect an oration; in fact, the first speech I ever made was at a meeting in my home city. That was a public reception given in honor of a very popular Methodist preacher who had been returned to his charge for the seventh consecutive year, and I had been asked to speak on behalf of the citizens, the public, and I agreed to do so, but when I got into that pulpit for the first time in my life and saw a great audience before me, and all of those hallowed surroundings above me, I think I must have spoken in a very sentimental vein, because when I had finished and took my seat over to the right of the rostrum inside the rail, a good old Methodist neighbor who lived a square and a half from me for many years, arose seven or eight seats back and came walking down the aisle hurriedly and took me by the hand and said, "God bless you, neighbor Barnhart, if you knew more of the Bible and were an out and out Christian and hadn't been a Democrat so long, you'd make a good preacher." (Laughter).

Another thing, some years ago I was accidentally elected to Congress, and when I went to Congress, I went in mid-term, that is to say, I was elected to fill the unexpired term of a deceased member, and the Congressional Directory, as it always does, carried a considerable write-up of my more or less illustrious career. I prepared most of it myself—I will tell you the truth about it—and I set forth that I had grown up on a farm, that I lived on a farm several years after I was married, that I had been engaged in the newspaper business, that incidentally I was a member of the Board of Directors of the State Correctional Institutions and afterward a member of the Board of Trustees of the State Benevolent Institutions. One day Uncle Joe (Cannon) was in the cloakroom talking with one of my colleagues from Indiana and said: "I see this new man from your State has had a remarkably consistent career. He was first a farmer, then settled down in the editorial chair; he didn't like the newspaper business very much, so from there he went to the penitentiary, and then to the insane hospital, and then, in the very nature of consistency, to Congress." (Laughter).

I do not know very much about this new era of road building. You know we have been kept on the job very closely for the last eight or ten months in Washington; I sometimes think too close for your good and ours too, but that is neither here nor there. Notwithstanding that, the spirit of better roads, the enthusiasm for better roads and the need for better roads everywhere has finally reached Congress and you have regularly delegated committees to look after the question of good roads. And fortunately or unfortunately, I happen to be a member of that committee and have helped to put two bills through the House providing government aid for roads.

In this connection I am going to introduce my talk, what I have to say on the good roads, by reading you a text that I secured one day in a conversation with a man in the Agricultural Department who gave me some figures, that, to me, were very interesting. He said that it cost, by horse and wagon transportation on the average road in the United States as now constructed, 23 cents to move a ton of produce or freight a mile; 23 cents a mile, that is the average cost; on the railroads a ton of transportation cost about 7½ mills per mile, and by the Erie Canal, about 3 mills per mile. On this basis, and I want you to remember this, a dollar will send a ton of ordinary freight by horse and wagon on an average road a little more than four miles; by railroad, at carload rates, a dollar will send a ton of freight nearly 133 miles, and by the Erie Canal about 500 miles. Also, if a horse can move a ton of freight on a level road, it will require two horses to move that ton on a 10% up grade, four horses to move it on a 20% up grade and eight horses to move it on a 33% up grade. We all recognize that up grade is resistance, and if our improperly constructed roads contribute the same resistance, and they surely do, which we discover in order to contribute the least cost of highway traffic is beyond any question whatever.

I was particularly impressed with the remarks of the gentleman from western Pennsylvania, who lives out in my part of the country. When he called attention to the fact that potatoes were being sold by the farmer not very far from the market place for 30 cents a bushel but that it cost the people in this market place a dollar a bushel to purchase those products, I never before have had the illustration of the importance of good highways as a contributory benefit to cheapening the high cost of living impressed upon me as those very few words impressed me. We have men, especially politicians, giving us all sorts of nostrums for reducing the so-called high cost of living, and in a measure there is some need along that line, but it is our wastefulness, men, more than anything else, that has to do with the high cost of living. We do the work, we expend the energy, we spend the money necessary to make the appropriations, and then we waste; but we are getting over it more and more, and if some of you men who are about as old as I am, will go back not so very many years and compare the conditions then with the conditions now, you will see what economics and the practical use of the gray matter is doing in the way of providing better things for the farmer. I have often thought, in travelling over the country, what I beheld on those pictures here tonight, that just a little practicality in the matter of making public improvements will not only add greatly to the appearance of the country and to the comfort of traveling, but it will add to the value of adjoining real estate; it must, in the very nature of things be so. And therefore I have been an earnest advocate of the idea of the U. S. Government contributing its share in the upbuilding of these roads running through rural districts, where the expense thereof by the rural districts alone would be so heavy, it would be almost an impossibility. So we have passed in the House at this session of Congress a bill providing that the Government shall appropriate as a road fund to be placed at the disposal of the Secretary of Agriculture of the United States, $25,000,000. That is a good deal of money, but a large per cent. of it will come from income taxes and from men, as we believe, living in the large cities who are wearing out your country roads and not paying a dollar to assist in keeping them up. We expect, under the provisions of this bill, that there will be allotted to each State in the Union a lump sum of $65,000; the balance of this money will be apportioned to the states in the proportion, first, of the population of that particular state to the whole United States, and then in proportion, as a secondary consideration, to all of the miles of improved roads in that state to all of the roads of the states of the Union. In that way it has been figured out that the Government of the United States will put up what is sometimes known as 50-50; where the state puts up a dollar, the Government will put up a dollar to the extent of the limit of the appropriation, and in that way those who will help themselves will be helped by the Government. This fund, as I said, will be placed in the care and keeping and at the disposal of the Secretary of Agriculture, who will re-distribute it to the road departments of the several states which have been regularly and legally constituted, and on the request of these road commissions and after the specifications have been presented to the Department of Agriculture which show that the work has been done in a skillful manner and in a way that will conduce to the building of a permanent and durable highway.

There is objection to it. Some people say that each and every community ought to stand on its own legs, so to speak, and, in a measure, that is true; but nevertheless, the road question, as I see it, is one wherein, in certain instances, it is very important to have a good road, that the conditions in that particular township or in that county may be such that the raising of the necessary revenues to construct the kind of a road that the general public needs and that the general welfare of business demands, would cost more than the community could possibly afford to spend for the road.

Another thing, is the importance, in these road commissions, of having men at the head of your State commissions who understand their business. In Indiana it is said that we have wasted 10 times as much money in road building as we have ever secured benefits from, and we have done it by all sorts of makeshift cut and cover road building in practically all of the years gone by. We have, in proportion to the area of the state, the largest, the greatest number of improved road miles of any state in this Union, but I am not going to boast to you especially as to how well and how substantially they are improved. We have gravel in Indiana most anywhere; we can dig anywhere along the side of the road and find a good quality of road building gravel, and that has helped very much in the matter of constructing good roads. But we are reaching a point where we must tear up most of these roads that we already have because of improper grading, of improper drainage and of the lack of all of the essentials that go to make a roadbed that will endure. Nothing is so important in the building of a road, as I see it, as the construction of the foundation for that road. Once you have the construction, you will always have a good road with just a little top dressing from time to time, and a little care. If you do not have the good foundation, you will never have a good road. That is the experience in our country, and I take it that it is yours.

I am delighted this evening to see some ladies present. I wish you men would have all sent your wives to this meeting for me to talk to this evening. I know you when I look into your faces, and you are just about like I am. I thought of a circumstance this evening when my boys came home from college one time and one of them wore a little red hat, a senior hat, and the other a green cap with a long vizor, and they had their trousers rolled up about half way to their knees and their sleeves rolled up above their elbows, and they were sitting on my porch and one day I said to them: "It may be all right for you boys to wear this fantastic garb at college, probably the boys there all do, but you are not making yourselves and your father any friends with the fellows who come along here and stop at the porch to talk to your father while wearing that sort of clothes;" and when I went away, the younger one said to his brother, "Dad's all right financially, but he is slow." And that is the trouble about these men when they reach our age, we are all a little slow, we get a good deal fixed in our minds about "whatever is, is right" as we see it, and we don't change very much. I have always been very successful in the talks I have made if I had plenty of women and boys in my audience; that is my strong forte, and I am going to talk a little to you women about your husbands, and I may have to talk to you husbands about your wives.

What I shall say don't have much to do with roads; I never made a speech in my life where I stuck to my text. I have written out skeletons of addresses and have gone to the platform, and when I left the platform I would find that I had scarcely said anything of what I was going to say. I have had a little experience recently in some theoretical farming. I wrote a magazine article and I sold it for $17.50 on "How to Keep Boys and Girls on the Farm," and I will tell you about what I said in that article. I purchased an estate near my home town of some two hundred odd acres some years ago that had been in the hands of some heirs of a deceased State Senator for about 15 years, and it was not the ideal farm. After spending all of the Congressional salary that I had laid away for several years in building fences and shaping up the buildings and getting the place in condition, I had a fairly respectable looking place, and I sometimes relate that to my friends in Washington when we haven't much else to do in the evening; and my friend Patton has heard that and he wanted me to tell you something about my farm.

I have a color scheme on my farm and I advocated it in this article I published in that magazine that the way to keep the boys and girls on the farm is to make the farm as nearly attractive as city life and as much as you possibly can avoid keeping the boy and girl in the dreary atmosphere of farm life. That was some years ago and applies to a good many farms now. Boys and girls are going to be attracted by the bright glare of the city life and the picture shows and all the things that go with them, and if you want to hold them on the farm, you have got to show them something there besides work, or they are going to keep on getting away as they are doing at the present time, and this thought occurred to me, that I would adopt a color scheme and I would try that out, and I did it. I painted my outbuildings, all four of them, yellow, just as yellow as yellow can be, and trimmed them in white. I painted my house white and trimmed it in yellow. I secured some gold and yellow sorrel horses with white faces, as white faces as I could get. Then I bought some Guernsey cattle—I don't have them any more, I have gone into the Durham business—but I bought these yellow and white cattle, and I bought and have raised yellow Jersey hogs; I have yellow Bourbon turkeys, buff Oppington chickens; I have the yellow Collie dog with a white ring around his neck and great bushy tail; I have a yellow cat, white ducks with yellow feet, and down across the creek in some old forest trees, we have some yellow fox squirrels, who flaunted pictures in the ambient air with their yellow tails, and in the orchard I have some Grimes Golden apples and there are some yellow hammers flitting here and there occasionally and then there are some yellow hammers driving along the road not of the feathered tribe, and they say "Wouldn't that kind of a farm kill you?" But I tell you what it does. I have had that farm for nine years. After I had it ready, I got 27 applications from some of the best men in my county to take that farm. I took a good man out of that list and put him on there and he is with me today; he is making money, he is careful, he has raised four daughters and a son, he has them in the graded school, he is out of debt and without boasting, he is the best friend, except my own family, that I have in the world.

A Member: Are his children yellow? (Laughter).

MR. BARNHART: The children are not yellow, they are white, though, and they match the farm in that respect. (Laughter). It may be that it is all right to paint the house green and the barn red and to have all sorts of colors, but I found it more attractive the other way. It did not cost me a cent, and the fact that my farm has the reputation of being a color-scheme farm would enable me to get more per acre than any of my neighbors who let theirs run along in the old ramshackle way. Some of you won't agree with that, and I may be wrong, but until I discover that I am wrong, I am going to believe that the artistic on the farm, when it does not cost you anything, is going to be the means, along with the telephone and the improved public highway and the automobile, of keeping the boys and girls on the farm where they ought to remain, because, of all of the vocations in life that I have ever encountered, the independent farmer can be the happiest and most contented of all if he will.

I am going to say a word about the young man. I see before me only two in this audience who are not reaching along toward middle life, at least; but I delivered an address to a graduating class of an agricultural college last year and I had before me all young men, and I said to them: "Young fellows, you are just entering upon manhood's estate, and you stand up clear-eyed and clear-minded, and look all the world in the face. It cost a lot of money to bring you up, boys. Some statistician has figured it out that it costs an average of $2,700 to bring children from babyhood to manhood, to clothe them, doctor them, educate them and make men and women of them;" and I said, "Fellows, that's a lot of money to put into flesh and blood, isn't it? But you cost vastly more than that; you have cost your father many short meals and long hours and hard knocks and self-sacrifices, and already his hair is beginning to streak with gray and your mother, ah, fellows, you will never know of the heartaches, the self-sacrifices, the pain, the anguish, the sleepless nights that she has given to make a man of you.. Doesn't that sober you, young fellows? Don't you begin to realize that some of these days you are going to be called upon to take your place, to step into your father's shoes and take his place in the affairs of men? He wouldn't like to have you call him old, but just the same, he is not as young as he used to be; and your mother is already beginning to lean on you. Doesn't that sober you, young fellows? You may think that you will not be able to meet the requirements, but once the load is fairly strapped on your strong, young shoulders, you will carry it and scarcely realize that it is there, if you only have the willing mind." And then I said to them, "Boys, it is high time sirs, that you were beginning to pay the freight and the back debts that you owe your father and mother; but you will pay them, won't you, boys? How? By being always and everywhere a man."

And I want to say something to you men. The place to take the true measure of a man is not necessarily on the farm or in the "Amen corner," not in the shops nor in the office and not in the forum nor on the platform, but at his own family fireside. There man lays aside the mask and we may readily see whether he is a hero or a humbug, a king or a coward. I care never a whit what a man's politics or religion may be; I care not if he prays every night and morning until he is red in the face and so loud that he shakes the eternal hills; if his family dreads to hear his footsteps when he comes toward the house and if the stock is shy and fearful in his presence, that man is not on the square. But, if on the other hand, his children and his dog meet him with a yell of delight, when they see him coming and if love's own sunshine illumines the face of his loved one when she hears him, that man is pure gold and his home is a heaven, for the humbug never gets that near the great white throne.

And then another thing, men, I was asked this evening to relate to you the circumstance of tired hands. Billy was riding on a railroad train one time and the train stopped at a station and he said a large fat man got aboard the train and, as there was only one vacant seat and that was the one Billy was partly occupying, the fat man, whom Billy analyzed as a farmer from the milk splotches on his boots, sat down with Bill, in fact, partly on him, not because he meant to be impolite, but because he was built that way and couldn't help sitting on him, and Billy said that immediately after he had taken his seat, he discovered that the man fixed a stare on an imaginary spot in the aisle of the car and looked at that spot by the mile. Billy finally became impatient and touched him on the elbow and said, "What is the matter my friend? Are you in trouble?" "Oh no, I am not in trouble." "No debts?" "No, I am out of debt and have four nice boys and we have a mother and that is what I was thinking about. You see in other years we had to work awfully hard to pay the interest on our debts and to get the clothes and provide the books for our boys and try to bring them along and make men out of them, and mother worked hardest of all. The boys and I had time occasionally to go to the blacksmith shop and over to Wasser's store and to the circus, and went to campaign rallies, but mother was always so busy it seemed she never had time to go along."

Here is a picture of some years ago and some of you men will recognize it. The farmer continued: "You see on Monday she washed, on Tuesday she ironed, on Wednesday she mended the clothes for the boys and me, and on Thursday she worked the garden and looked after the setting hens, etc., and churned, and on Friday she scrubbed the floors, rid up things about the house and on Saturday she baked and commenced preparing for the big Sunday dinner that she was going to spread for the neighbors that were coming in and the boys that were coming to play with our boys. On Sunday morning she got up early and gathered up the soiled clothes for the boys and myself and laid out our clean clothes and put the soiled ones—made ready for the wash and prepared the breakfast, and when that was over and she had cleaned the dishes away, she commenced preparing the dinner and was so busy about that that she barely had time to say "How-d do, make yourselves at home" to the gathering guests and then served dinner to two full sittings of people and get the dishes washed and her hands wiped dry and her gingham apron changed for one of white just in time to say good-bye to the departing guests, and then she went to bed all tired out with a glorious prospect that she was going to arise on the following morning and do the same thing over again, day after day and week after week and year after year, until one morning she didn't get up and I hurriedly sent for a doctor and he came and after looking her over, said 'My friend you have sent for me too late,' and four days after that we laid her away up yonder against the hillside where you see those pine trees and the snow is more than two feet deep over her now." And then he looked down on that imaginary spot in the aisle of the car again for a long time, and Bill mustered up the courage to touch him on the elbow and in a husky voice, said "What did she die of, my friend?" And he said, "Just tired hands."

I don't know that we do it any more, but I remember the time when we really did forget about mother and I want to impress upon you men, if there are any here who do sometimes forget, to not do so any more. I tell you the mother in the home is the royal diadem of earth's creation, she is the best asset we have, and every time I have had an opportunity to lecture to young men just graduating out of high schools, I tell them to get married and marry a girl who knows how to do things and can really be a life partner that is worth having.

But we have a lot of other things, we have trials and tribulations, we complain a good deal, we see things that are not right, don't we? And we borrow a whole lot of trouble. I heard of an art critic once who was coming down through a public park one day twirling his cane, and in passing a gateway he saw an owl mounted on a post, and he said to himself, "The taxidermist that mounted that bird was a blacksmith; its beak droops too low, the eyes are too staring, its breast is too flat, there are too many feathers on his legs, his tail droops too low and his wings are badly poised." Just then the owl turned his head and flew away, and the critic said, "He flies like a goose." (Laughter). We sometimes do that; we say all the things about a fellow we can think of and when we can't think of anything else. We say he is bow-legged or something of that sort for which he is not responsible, and then we give up. I have seen people give up in absolute despair and say, "I can't." Oh, that word "can't" has done more than anything else to prevent progress, it has done more than any other word in the language to hold men back. If I had said as a boy, fifteen miles from market center, when I was a little chap "I can't," I'd be out there somewhere yet, I presume, and maybe I'd be better off, I don't know, but the thing of saying "can't" often suggests the poem once recited in my presence by old General Sherwood, a member of Congress, 81 years old. He was talking about fellows always saying "I can't," and he said he never got away from this poem:

"There was a man named Joseph Cable
Who got a goat just for his stable.
One day the goat desired to dine,
And ate a red shirt right off the line;
Then Cable to the goat did say
'Your time has come, you'll die this day;'
And took him to the railroad track
And bound that goat down on his back.
The train then came and the whistle blew,
And the goat well knew his time was due,
But with a mighty shriek of pain,
Coughed up the shirt and flagged the train."

We can cough up the shirt all right ordinarily if we will just do it, and a good many times we could avoid swallowing it if we would have a little foresight.

That is getting a long way from the road question, isn't it? Nevertheless, as I said to you in the beginning, the road question has been so splendidly presented to you, that most of the things I had in mind were said by your superintendent who seems to know a good deal more than I do about the road question, and therefore, ladies and gentlemen, I am greatly honored, I assure you, to have been invited to come and address you and I am going to close by saying to you what I often say, that it is worth while for any man and woman to make money. You can make it when you have good roads, and you ought to make money. There are tremendous demands for money in the world's work of this day; the education of our children, the question of charities and corrections and all is demanding more and more money and it is your duty to make money and to let loose of some of it, because I believe that the man and woman that strives early and late to gather dollars, to grab every one they can see, to hoard it up somewhere that their children may have something to quarrel over, after they have gone, would about as well never have lived. That kind of money making is hardly worth while, and yet the spendthrift has no place in the economy of our country either.

What I particularly meant to say was that while you are making this money, and, I hope, making it for the purpose of benefiting your country by doing it, there is one measure of caution that every man and woman ought to adopt, and that is to see that it is made on the square, because after you have accumulated wealth, after you have surrendered yourselves with home and family and friends, after you have stood in the leadership of men in scholastic, industrial or professional endeavor, after you have achieved distinction in politics or other avenues of public life—after all of these and possibly many more accomplishments, there will come a day when you will be tired of it all and you will lie upon that couch that has furnished you refreshing rest in all of the years gone by, you will be feverish and fretful and toss about and you will be surrounded by friends that have been your mainstay of strength and support always, and you will be attended by the best medical attendance that your abundance of money can employ, and in the midst of it all, when it might be expected that you would continue to look to these earthly agencies for strength and support, you will turn your back upon it all, and you will reach a hand out into space, and your lips will beseechingly implore:

"Other refuge have I none,
Hangs my helpless soul on thee;
Leave, oh, leave me not alone;
Still support and comfort me."

Men and women, let us do our work each day so that if the darkened hours of despair overtake us, we will not forget the strength which comforts us in the desolation of other times. May we ever remember those bright hours that found us strolling through the childhood of our youth among the picturesque hills and beautiful valleys thereof or lying dreaming on the margin of some quiet river when a light glowed within us, as it has within all of us, and we promised our early God to have courage through it all. Spare us from bitterness and the sharp pangs of unguarded moments; lift our eyes from the earth that we may not forget the uses of the stars; let us not judge others too harshly, lest we might condemn ourselves. Give us a few friends who will love us for what we are, and keep ever burning before our vagrant steps the kindly light of hope, and then, though age and infirmity come upon us and we have come not within sight of the castle of our dreams, we can still be thankful for times old and memories that are good and sweet and the evening twilight of life will find us gentle, contented and happy still. I thank you. (Applause).

THE NECESSITY OF LIME IN PENNSYLVANIA AGRICULTURE

By W. M. PATTON, *Mosgrove, Pa.*

Mr. Chairman, Ladies and Gentlemen: I am pleased to stand before you this morning in my homeliness, feeling indeed and in truth that I am recognized by some of you, because some of you into whose friendship I have found my way with somewhat common-placeness, have said to me when you came to greet me, that undoubtedly I was not the same fellow you once knew. There always come to us along the lines of life's various changes, and at the conclusion of this year's institute work, when I came home, my good wife said to me, "Won't you remove that nasty old beard of yours; you would look like a boy again?" One morning, in order to harmonize with her kind desire, I did so, unbeknown to the members of the family, and not a child of mine, of whom I have six, had ever seen me going without a moustache; and when I came into the living-room to be confronted by my three boys, the oldest looked into my face and then looked at my farmer's garb and then recognized me and said, "Papa, you look like so and so;" and the other little boy, a couple of years younger, said, "You look like so and so." The following day some good friends came into my home to spend an hour or two with us and I related the incidents and my friend looked at me a little bit and said, "Do you know I think you look like the devil." (Laughter).

Now, if you will accept me in my disguise, and yet it is my natural being, I want to talk with you this morning briefly and somewhat hurriedly, possibly, concerning a subject that is wonderfully dear to me because of the fact that out of judicious use of lime I have made an old farm, not to bloom and blossom like the Garden of Eden, but I have made it come from non-productiveness onto a paying basis. The subject of lime and its necessity in agriculture in Pennsylvania, as I knew it, is misunderstood, in a pretty well defined sense, in even the best agricultural sections in this good old Commonwealth of ours. I do not think there is another state in all the United States that has a greater diversity of soils than we have; I do not think there is another state in our whole conglomerate list that raises a greater variety of crops; I do not think there is a more progressive set of farmers in the universe than Pennsylvania has. Yet I regret to say to you this morning that in a good many localities the farming of Pennsylvania has fallen into disapproval, and a goodly number of people are coming to us extending the helping hand and saying, "What is the matter with you farmers? Why the high cost of these products? Why don't you raise more?" And indeed and in truth, echo answers, "why."

The truth of the matter is we have had at our command these many years, lo these many years, commercial fertilizers in all their various forms, and we have had the lime available because there isn't another Commonwealth in the whole conglomerate section of states that is so generously supplied with lime as ours, but we have not used it. Only of recent years in various sections of this State have people come to the recognition of the fact that in order to perpetuate the growth of certain crops, and those crops especially beneficial to their best good, have they come, I say, to a recognition of the fact that they must resort to the use of lime.

Now there has been a cause for this. There are groups of counties in this Commonwealth through which I have had occasion to pass during the past season, where Nature has, in a measure, been niggardly in the dispensing of her providences; where lime is not found. But you go westward, and starting with that good old section from which the homely old fellow who stands before you this morning and a number of others almost equal in homeliness, come from, and over there we have lime miscellaneously distributed but easy to access to that extent that we feel like using it. We can get it, we can burn it upon our farms, we can get it commercially at a not too extravagant expense and use it if we so desire. Coming still eastward, as we came along over from Pittsburgh on Monday afternoon, as we go down in the Tyrone district until we get into this beautiful Lebanon Valley, where we find the lime projecting a number of feet above the soil and where it is abundantly distributed all over our Commonwealth, I say to you that that misconception has gone out long years ago, when I was a boy, comparatively speaking, because thirty-five years ago I came into possession of the old farm of which I am the owner; there had never been a single bushel of lime used on that farm; true it had passed through hands that had carried it almost from its virginity down to the time I became the possessor, and there may not have been, and yet I think there did exist a cause for a use of lime prior to my possession thereof. That condition obtains in a large measure all over the State in various sections, to-day, many people are deterred from using lime by reason of the fact of its expensiveness. Many people are deterred from its use because of the fact of its unpleasantness. Many people are deterred from its use by reason of a confidence they have, and yet I think we universally, collectively and individually are coming to an acceptation of the truth in a general sense that if we are to maintain the soil fertility, the foundation of all truly successful agriculture, we must grow such crops as can be grown only by the judicious application of lime.

I said to you a moment ago that the expensive side of the proposition was a consideration. Now, that is true; and yet that expensiveness can be obviated, in a measure, if we, as farmers in communities, will band ourselves together harmoniously and work shoulder to shoulder with the purpose of serving our communities' best good and our individual good. We can purchase this commodity for our farms if we be so unfortunate as not to have it upon the farms, at a much cheaper rate than is obtainable when an individual comes to purchase it in an individual sense. I think that we farmers are more slow than any other organized body, and we are not organized any more than any other company of individuals who are working along conjoint lines in the universe. To recognize the power and the force that within us lies if we will work shoulder to shoulder and in harmony one with the other. However, the general trend is when we want to make a purchase for our farms, we possess ourselves with that aloofness which prompts us to stand aside, and alone, and one individual will send off, in correspondence form, to a vender of these products which he must have and solicit the purchase, and that coming in a small form, naturally the maximum price has to be paid.

I have in mind at the present moment a little concrete incident, and this little incident that I want to give you will better illustrate possibly than I could put it in words of my own, the application on the home farm, of what I mean. Beginning a month earlier in the winter, we had occasion to put into the home some of the necessaries relating to the culinary department, those foods which are just as safe on the pantry shelf as they are in the country store. And in order to relieve ourselves of the necessity of hustling off and purchasing any of those things in town in small quantities, I took down that good old family bible with which we are all familiar—there's scarcely a man or a woman in this audience who hasn't some acquaintance with Sears-Roebuck & Company's catalogue—and I took that down to find out what certain food products would cost me freighted from Chicago to my home. I did not want to buy some things in five pound packages—take rice, for example, I wanted a hundred pounds; and take Fels Naptha soap, I wanted a hundred pounds of that; I wanted a hundred pounds of soup beans, sugar, coffee and those things which are absolutely staple upon the farm, I wanted in such quantities as they would last during the winter months, and after I had made a consultation of this directory of information, I went down to the little home merchant who buys my surplus commodities and pays me the top price, and I said to him: "I have in mind the purchase of certain articles of food that we must have, name me a price on them, will you." And his reply to me was, "Will you give me a day's time to figure on that?" "Certainly, I am in no hurry;" and the outcome was that from the little individual who ran the little corner grocery down in my home town, the man who purchases my surplus products from the farm and pays me the top price, gave me those products with his personal guarantee for them, at 65 cents less, charged to me, than I could have gotten them from the Sears-Roebuck Company, Chicago. What applied to that particular individual, what applied, to that case, if you please, applies to the lime proposition, and I say to you that you and I do not serve our own best purposes when we sit idly by and permit ourselves to be hedged about, by those conditions that we are forced eventually to go to the vender of these commodities in an individual sense and say to him, "I want 20 tons of lime." Do you know that the little Jew who comes into our community and establishes himself in a little cheap hovel on a side street and commences to vend his cheap clothing, better understands this process of buying than you and I.

A Member: Are you a Granger?

MR. PATTON: No, I am not a Granger; I wish I were.

A Member: You'd better be.

MR. PATTON: I am a living example of being made such in any community in which I find myself and have credentials to carry me through, at a moment's notice; but even you Grangers do not put back of your organization that strength, that force, that power, if you please, of which you are possessed, along these lines of purchasing for the farm. I started in to say to you that the little Jew clothing man better understands this than do most of us farmers who have been in the harness so long, lo these many years, till our heads have grown hoary in the tilling of the farm and purchasing those commodities that come to us as a matter of necessity. That little fellow one morning, after having married a beautiful American girl, prepared for her a home, placed her therein and eventually there came to bless that union a little baby, one of those things so necessary in every well regulated home to bring true happiness. Shortly after its coming, he came over one morning from the little store to find out how Rachel, the beloved one, and the baby were getting along, and coming into that simple home, he found her there with that downy little nestling, if you please, cuddled up in her flexed arm, and was singing to it in tones that only a mother can use, "Bye, oh baby, by lo baby," and his ideas of the power of the mother's expression could not restrain him, and stealing forward, stealthily he touched her upon the shoulder and said, in the Jewish tone, "Dot is right, Rachel, you teach him buy low and I teach him sell high; make good business man out of him." (Laughter). Now that buy low is a consideration when you come to this product of the lime for the farm, and I want to say to you that there are misconceptions growing out, as I view it, of the actual value of lime. Those who sell it in certain localities even make for it the claim that it is a plant food, which, in itself, from my viewpoint, I think is erroneous. Within itself it is not capable of producing vegetation. There is even a misconception as to the possibilities of lime in its crude form in Mother Earth. Plato, Cato, Socrates, Aristotle, Pliny, all those old fellows of the long ago, who, before the coming upon the scene of Jesus Christ, wrote along agricultural lines, even delved into agricultural literature—some of those olden characters made the positive assertion that the percolation of the waters through the limestone district had the effect that water would disintegrate the lime particles and carry them into the strata below the surface and that capillary attraction would draw them into the roots of the plant. The recent writers on agricultural lime have, in a measure, confirmed this belief, but I think it is generally accepted at this time, and we, this morning, in this beautiful City of Reading find ourselves surrounded by conditions which, in themselves, refute that statement.

Pass out through the Lebanon Valley, if you please, from here to Harrisburg, where you will find the lime content of these hills protruding in some instances above the meadows themselves; get up into Clinton and Lycoming counties where the lime is so bountiful and you will find it extending above Mother Earth to the height of 190 feet; get over into our home section and you will find it hidden seven to nine feet and even a hundred feet under the surface of the earth and we have to put down mines to bring it forth—the best doctrine we can bring to those agricultural labors of ours is the doctrine from common sense based upon actual practice and actual experience, and there is no source to which you and I, we jointly, can go as a body than to the soil itself. The good old book of Job, I cannot give you the verse and chapter and that is immaterial anyhow, but the good old book of Job makes a declaration coming from the lips of that wonderful man, this is the statement: "Ask the soil and it shall answer thee;" and you people of the Lehigh Valley and the Reading districts and the surrounding beautiful fertile country, ask your soils through the plow and the crops you apply to your soil, the question, "Will the disintegration of the lime content of these soils be sufficient, when it finds its way into the capillary waters, be sufficient to rise and perpetuate the lime content of our soils for the continuation of the successful growing of leguminous crops?" And it comes back to you with a thundering, No. We must artificially or naturally, if you please, introduce into our soil from time to time an application of lime.

Why is it necessary? I have intimated to you that in my judgment lime is not a fertilizer. I have intimated to you that it is not a plant food in the sense that manures are. I want to say to you, with emphasis, that in my judgment it does perform upon our soils functions which are wonderfully important but not as multitudinous as one would have us believe. So far as my personal experience goes, I have derived from the judicious use of lime in all its various forms upon my home farm advantages which have been worth while. When I have found a piece of soil that has come to that point along the lines of rotation followed by those who preceeded me, that soil has become tough, tenacious, close in texture and needs a loosening up, needs putting in that condition, if you please, that the bacterial development within that soil, of which we knew so little a few years ago, and yet, in order that that development can go forward as the bacteria upon which we now depend so largely for the successful development of the legumes can take place in that multitudinous form into which thev should develop to reach their best good—into a soil of that kind the introduction of lime is very beneficial. If we have allowed that old field which lays away out there somewhat remotely situated from the farm buildings, to go back, in a sense, to Mother Nature's way, if we have allowed that old field loving Nature to supplant us and take up her course of procedure and when we have failed to grow thereon crops of a successful character, Nature has come to the rescue and established crops of grass, rag weeds or any of the old volunteer crops that will come when we stop—an application of lime to that field will be beneficial.

Those are two of the instances; but in my judgment, fellow farmers and co-workers, those two instances are as pigmies compared with the third, and that third instance is when we make an application of lime to our soils to control soil acidity, to bring our soils to that sweet condition of which, when we are possessed, we can grow the legumes in any of their forms. So much then for the necessity for it. Now the question naturally comes up, how shall we apply it? It is not my purpose to give you a full, cut and dried synopsis that will govern all conditions under which a man may be surrounded. It is my belief, however, that of the many forms in which lime is applied in this State, there are some that are deserving of a certain measure of condemnation. Now I recognize, because it has been my privilege to discuss this subject almost from one corner of this Commonwealth to the other and here and there I meet with an individual who locally may not agree with me; but in the main, ordinarily, we arrive at a harmonious conclusion. I believe, my good friends, that there are certain localities in this Commonwealth where farmers who are thoroughly straightforward and interested in the best good of their farms and practicing those practices in the use of lime that are somewhat injudicious.

I will mention briefly some of those practices. Coming down to Reading, between here and Harrisburg, I observed an oat field to which an application had been made. I cannot tell you how extravagantly, but I apprehend from the appearances so far as I could observe them, that it had been rather free. I presume at least seventy-five to eighty bushels of burnt lime to the acre, and that lime had been drawn out—that ground had been broken and that lime had been drawn out and placed in small piles, I don't know how large, but too large, I am going to tell you that, too large; that lime had been drawn out and placed in small piles and after the ground had been broken, an application of it was made by broad-casting it with a shovel of some sort and the mixture was made as nearly as possible by the tillage tools. I do not care what those tools may be of which you are possessed, the disc harrow, smoothing harrow, cutaway, double cutaway, or any other combination you can place upon it, if lime be applied to the average Pennsylvania soil in those small clusters of piles and permitted to remain there and you endeavor to distribute it with a long or a short handled shovel, you are going to get a surplus in one place and an insufficiency in others. You cannot mix it properly in that way. I am convinced of the accuracy of the statement I have made by reason of the fact that we could see with all completeness as we came along on the train a well defined line of demarcation where those piles had lain, indicating the surplus. Nor is that the only cause; the professional man appears upon the scene and makes a declaration that lime that is so treated, lime which is hauled out and put in small piles and permitted to lie there for any considerable length of time, loses by leeching at that especial point on which it is placed, approximately 40 per cent. of its correctiveness power within the soil. That is irregular.

There are certain other localities in this Commonwealth, where, by reason of their remoteness, etc., they have to get lime into and upon their farms; they are forced during the winter months to haul it and use it in much the same sense this was used. Aside from that it is applied to the soil during the winter months and then the plow is started in springtime, and as they plow up to this soldier-like row of piles, it is distributed through the broken soil. In other instances, it is hauled and applied immediately to that soil and that soil is broken for corn and the lime is turned in, turned under I want to say, because the average Pennsylvania farmer with the breaking plow that is used in this Commonwealth, generally has too much of a tendency to upset his furrow and turn the organic matter as well as the lime to the bottom of the furrow, and that is where you do not want it. The consequence is that his rotation is such that that soil is first seeded to corn and then broken for oats, and his purpose and intent is and his idea was to bring back that application of lime in the soil that he had broken for oats and have that soil, that furrow slice sweetened so that the following crop, which will be wheat, he will have the acidity corrected and assure himself of a perfect stand of clover. That is all right and proper; it is a time saver possibly, a money saver possibly, and it is helpful when a man can do that work, when time is not valuable to him, as he can do it in the winter months, but it is an impossibility generally for a man to break that soil for corn and bring it back, because nine-tenths of the farmers do not plow as deeply for oats as for corn and that little flake of lime applied to the furrow slice is left down in subsoil where you don't want it.

Those of you in the various sections of this State, because we differ very materially, we of the west and the locality from which I come, seed down almost invariably with our wheat; you people down here, as I understand it, seed down very largely with your oats; up in the northern tier of counties, they seed down largely with their oats and we seed down with our wheat in the springtime and are prompted to make an application of our lime to our soils, so that the correcting of the soil acidity shall have gone forward, that we will have the soil made in such form that when we have reached the springtime, the month or two which preceded us, when we come to the application of our clover seed, we know there is such a condition existing there that if we make a judicious application of our clover seed, we are almost assured of a stand. On the other hand the people who are forced to make an application of lime to the oats are harassed by reason of such conditions as existed this spring. I have talked to some of your good members since I came here who told me that they had just got their oats in last week. You had embarrassment getting those oats in without the application of the lime, which requires sometime, and we are hedged about by conditions in which you are handicapped for time with this method.

Now as to the time—in my estimation, the good book you know says to us, there is a time for everything under the sun, and so far as I have seen, where it is permissible, where it can be practiced with judiciousness, where we can have that condition that we can go forward along this line of agriculture without entanglement and embarrassment and break the soil and prepare your lime, I care not what may be the quality or quantity you see fit to use, that is up to you, I am not here to extol any particular variety of lime, break that soil until you can smooth it down in such form that you can make a judicious application of your lime, then try the seed and seed the clover thereafter when that sweetening process has taken place and there will not be much likelihood of a failure in the clover stand which we speak of so much.

Incidentally, I should like to mention and to clear-up, in a measure, some of the fallacies as regards the different limes. In my home neighborhood there is a lime manufactory—I don't know that that is the right word, if not, I will explain myself with a little more completeness, and you can use your own expression concerning it—they quarry their lime, burn it, grind it, and if that is a lime factory, you have it—they quarry that lime, which is of a splendid carbonate percentage, and burn it and sell it in that form at $3 a ton, and then they grind it, and sell it at $6.75 a ton. The superintendent of that plant was in my home the other day; he paid me a little visit and in a private conversation, he told me confidentially, and I give it to you in confidence, because I want to let you into my confidence pertaining to this, he said confidentially, "There's lots of people in this Commonwealth who want lime and want it badly, but won't have it only in a certain form, and by reason of the convenience of that form, they pay us $6.75 for a commodity which we could sell them at $3 in just as good form; it only costs us 75 cents a ton to crush it, but if they are willing to do that, well and good."

Then there is the hydrated form. I have no fault to find with that hydrated lime; I think that we, as institute workers and farmers in a general sense, you as County Chairmen and all of us conjointly this morning understand the ins and outs of commonplace agriculture to that extent that we appreciate the fact that lime is only the product of the limestone rocks found so abundantly in mother earth. One hundred pounds of carbonate represent 66 pounds of that commodity recognized as caustic lime. We take that same 100 pounds of lime and burn it, don't slake it, but we hydrate it which is done by adding to that 56 pounds of lime approximately 118 pounds of water and we now have 175 or 176 pounds of water and lime. We haul that out and use it and pay about $1.50 to $2.50 a ton for the hydrating process which you, out on the farm, can do with a few pails of water yourself and save the purchasing and hauling of that water, save that excess cost and serve your own purpose just as well.

Then there is another form of applying it. When the good Lord created these old hills and valleys and mountains and placed within these Pennsylvania soils—I'll give him credit for having done so—that wonderful and marvellous content of ours that is placed there, we never burn a particle of it, he put it there in the raw form and until the hand of man touched these lands, Nature went forward in her processes using it in the raw form. I had occasion, a number of years ago, to be in the extreme western section of this State, and an individual approached me, stating, "I have something I want to show you;" and he showed me a sample of the finest pulverized raw limestone representing 98 per cent. of pure carbon lime, I ever saw in my life; and I became interested and said to him, "What will this cost me." "One dollar a ton at our plant in bulk form." "But I couldn't use it in bulk form, it is so fine that a man has no box in which he could transport it without serious loss; what will this cost me a sack?" "One dollar and sixty-five cents a sack." Sixty-five cents a sack for putting that lime in sacks; well, that is cheaper than you could do it, it is cheaper than I could do it, and I became interested and purchased a carload and hauled it home to the farm and made a judicious application of it to determine whether that lime would perform the function upon my land as the other did, and I have used in excess of 200 tons of that same commodity since and it is giving me perfect satisfaction.

CROP ROTATION

By PROF. FRANKLIN MENGES, *York, Pa.*

Mr. Chairman, Ladies and Gentlemen: I had a notion to read a speech to you this morning, but I cannot read it in half an hour. Now this question of crop rotation is one that I am undoubtedly interested in and I believe every farmer is. Crop rotation ought to do something for a farmer; it ought to produce the largest amount of human food at the least cost, and at the same time improve his lands. Now, if I would stop right there, probably I would have said all that is necessary to be said, because that is pretty near ideal, isn't it.

MR. BLACK: Then why don't you stop. (Laughter).

PROF. MENGES: Well, I am perfectly willing, Mr. Black, if the rest are, I'll stop. You see you can't embarrass me. (Laughter). You have been at that business before. (Laughter). Now, Mr. Seamans ought to sit beside you and we'd have a combination.

MR. BLACK: Where is he?

PROF. MENGES: Well, all right, I say I am going to leave that statement as my text and don't, for one minute, think I am going to stick to it, because I am not. We have here in this section where we are now, the old four-year rotation of grass and corn and oats or wheat and wheat and back to grass. We have been following that rotation from the time we started farming in the eastern section of Pennsylvania up to the present time, and I have been endeavoring to change some of those methods and I have run up against the Pennsylvania Dutchman, or two Dutchmen have run up against each other, and I have not been able to get this thing into their heads, that there ought to be some change along these lines. "Why." Why, because in that old rotation we raise well nigh all soil exhaustion crops and not any or very few soil improving crops. A rotation ought to be so arranged that a soil exhaustion crop is followed by a soil improving crop, or that a soil improving crop is grown with every soil exhaustion crop.

Now then that pretty near comes to carrying into effect the statement that I already made and in the old four-years rotation that that thing can be done and we are doing it. In our farm adviser work we are doing just that very thing. I think probably last winter, at the State Board meeting at Harrisburg, I referred to this matter, but it will not hurt to refer to it again. Over here in York county—and I am glad to go back to York county for my illustrations, because that is where I come from, and let me say right here, that we have just as poor farms in York county as you have in any other county, and we are willing to admit it, but we have just as good farms there and as good farmers as they have in any other county, not excluding Lancaster. Nobody is shouting. (Laughter).

A Member: Don't need to.

PROF. MENGES: Well, they don't say anything. (Laughter). In the northern section of that county there is an old farm (and there are a number of them) so poor that the man who owned it could not prevail on a tenant to remain there for more than a year, and sometimes he didn't stay a year, moved off because he couldn't live there. That gentleman came to the Department of Agriculture, and he asked the Secretary whether he couldn't send a man down there to help him out of his difficulties, and he was in difficulty. Now I am not here to blow my own horn; may be I am doing it, but I say I am not here for that purpose—and they sent me down there. What do you think of that? (Laughter). Bad enough, wasn't it? It's a wonder you didn't say that.

A Member: I thought it. (Laughter).

PROF. MENGES: I know you did, that's why I wanted to bring it out of you. Well, all right. There is a farm located on the Mesazoic, red shale and sandstone, hilly, washy, thin, depleted unorganic matter to such a degree that you could hardly find any, and we went over that proposition and I said to my friend, "You have a poor proposition." "Well," he said, "I know that, you didn't need to come up here to tell me that." "Well," I said, "I want you to know that I know it too." I said, "Will you do what I tell you?" He said, "Yes, I will." I said, "Over there is a grass field that I suppose you are going to plant with corn?" He said, "Yes." It looked like it had been a grass field one time, but they had the cows or cattle in there until they had eaten it off down to the roots, and then they sent the hogs in after the roots. (Laughter). That is no fabrication; and I said to him, "Plow that field and plow it good and cultivate it." He said he would, and now I said, "I will tell you what I would like you to do; I would like you to make a mixture of fertilizer as I tell you; will you do it?" He said, "Yes, I will." I said, "You make up a mixture of 1,000 pounds of basic slag, 800 pounds of 8 per cent. tankage and 200 pounds of muriate of potash."

A Member: Where do you get your potash?

PROF. MENGES: Well, that was before the Dutch were fighting. (Laughter). And they are not licked, either, Bob Seeds. (Laughter and applause).

MR. SEEDS: I bet you a Panama hat they will be.

PROF. MENGES: Well, I'll get the hat all right. (Laughter).

MR. SEEDS: Get the Irish to do it, if nobody else can do it.

PROF. MENGES: The Irish fight among themselves so much they haven't time to lick anybody else. (Laughter). And I said, "Apply about 250 pounds of that mixture right in the row with the corn." "All right." I said, "That will not hurt." "Why not." "Because the basic slag will neutralize any acidity that may be in the tankage, and the salt or the muriate of potash will not hurt corn anyhow." And he applied that and that started the corn, and then what did he do. Into that corn, at the last cultivation sometime early in July, we sowed a bushel of Whip-poor-will cowpeas and covered them by the last cultivation, and do you know that when we came to cut the corn, those cowpeas were that tall and taller and they covered the ground. We went in there with a disk harrow and we disk-harrowed the cowpeas into the ground and mixed them up thoroughly and then sowed wheat there, and with the wheat we sowed that same mixture of fertilizers at the rate of about 250 pounds to the acre. The next spring sometime in the early part of April, we sowed inoculated white blossom sweet clover seed at the rate of four to five quarts to the acre on that old field and harrowed it in, and after we harvested the wheat, we let the sweet clover go on growing until the middle of August, and I am sort of inclined to think it was somewhat after the middle of August, I am not sure about the date, and do you know, my friends, that we had sweet clover there that high. (showing). We plowed down the sweet clover, sowed the ground with wheat, and next summer, after the wheat was harvested, sowed Reginal side clover and timothy in accordance with Mr. Henry Palmer's method down here at Avondale.

Now, what did we do? Why, into that old four-years rotation, which is composed well nigh entirely of soil exhaustion crops, we introduced a soil improving crop with every soil exhaustion crop, and what is the result? The result is that that fellow has no trouble about having a renter on his farm. It cost him a little something to supply the seed, that is true, but at the same time he is improving that land, and let me say again it is just as poor as poor land is in Pennsylvania. Now that is the old four years rotation. Probably you would like to ask me some questions here.

MR. GLOVER: What do you do in the rotation if you grow oats?

PROF. MENGES: Sow this wheat clover with the oats; we sowed wheat clover two years ago and last year with the oats and we had splendid results; in fact I was up there this spring and you can see along the drills just as far as the sweet clover was sown with the oats, that the wheat is a great deal better. Now that can be done. I am not so sure, Mr. Glover, whether it will work as well with you as with us, because you have a little shorter season. I am not recommending these crops for the whole State of Pennsylvania, because your conditions are not the same as ours are.

MR. BRONG: It's all right as far north as Monroe county.

PROF. MENGES: It works that far north—well, I am glad you talked, Mr. Brong. Let us go along the line a little further. Take the three years rotation in a large number of sections of the states; the three years rotation is followed, grass and corn and Canada field peas and oats and back to grass. That is a splendid rotation; it is hard to beat; it is a rotation, my friends, that I believe will come nearer in the northern section of the State, to doing what I said a rotation ought to do, producing the largest amount of human food and at the same time improving the soil, than any other rotation I know of, providing you introduce some of these soil improving crops.

Now, let us see what can be done along that line. In the northern part of the State, do you know that the winter vetch has become one of the crops that will solve that problem, because rye and winter vetch sown together in the northern part of the State, will produce such results, and I can give instances where this thing has been done, that land invariably will become better the longer it is farmed. Now the trouble is, my friends, with vetch seed, that we cannot buy it because we cannot get it into the United States at such prices that we can afford to pay. And this brings me to a subject that lies pretty close to my heart, because I would like to introduce into the State of Pennsylvania this thing of raising our own seed. We must do it. In this very county in which we are today, take the Hudson River shale which runs along the western foot of the Kittatinny Mountains, beginning over in Northampton county, in Mr. Messinger's county, passing on through Lehigh, Berks, Lebanon, Dauphin, Cumberland and Franklin, are large areas of land so sandy that they get so dry they will not produce any one of our summer cereal crops. Now I am not condemning that land, but there are such sections and I suppose the gentlemen who are here will bear me out in the statement; isn't it true? Well now, what can we do? Do you know what can be done? Do you know that you can raise a crop of crimson clover seed on those soils, cut your crimson clover, plow down the sod, sow cowpeas there, a hot weather, a hot dry weather plant—you won't get a very large crop, but you will get quite a quantity of seed. You can do what? You can produce a crop of crimson clover seed and a crop of cowpea seed all in the same season; and not only that, but you can improve your land as you are doing. I say you can improve your land as you are doing. A crop of crimson clover seed is a paying crop; how is that, Mr. Anderson?

MR. ANDERSON: Usually it is; not always.

A Member: On poor land it is a paying crop, not on rich land.

PROF. MENGES: I know that, that is why I say take these soils; what kind of soils? Early spring farming soils, soils you can farm just as soon as the snow is off of them; you can go in there and plow them and they will never become hard; isn't that right? You can plant potatoes in those soils forever. These fellows down here in the valley don't dare think of it. Now then, what have you? Why, you have started your crimson clover and it will produce a crop by the time your other crops are just about getting well started, and then you can sow your cowpeas and when the hot dry weather comes along, those cowpeas will withstand the adversities of conditions and produce your crop of seed and then what? We can supply our own seed right here in the State of Pennsylvania, and that is exactly the thing we ought to do.

Now, there is another crop that I like to talk about and probably I will get myself into difficulty before I get done; but I have been in difficulty with you fellows before and always got away from you some way or other; and that is sweet clover. I say that crops of sweet clover—I was up here in Huntingdon county not long ago, in the valley of Markleysburg and Entriken, and right out from the town of Huntingdon those places are situated. We have a soil there that we call the Clinton shale, it is a red shale, and let me say right here that some of the Clinton shale is the best kind of clover land in the State of Pennsylvania, and there are hundreds of acres of that kind of land, not farms, running along that mountain there the name of which I have forgotten, from Huntingdon down to Bedford county, in and through Bedford county, hundreds of acres not farmed at all. A man asked me to come to his place and I went and here he had about 50 acres of that Clinton shale, hadn't raised anything on it. He said, "What can I do with it?" I said, "Raise sweet clover." And he went and plowed it up and this last spring that land has been seeded down for the first time with sweet clover. Now some people say that sweet clover is a weed and not to be endured. Well all right, I will take it for a weed and I like to have it if I can. I say we sowed that land with sweet clover; we are not going to get a crop this year, but next year we are going to have a crop. Now that crop of sweet clover seed—and in the State of Pennsylvania, my friends, the time is coming when the sweet clover will be such a crop that you and I will be absolutely in need of it, because we are going to farm along these lines of raising a soil improving crop with every soil exhausting crop and improving our land more and more the longer we farm it, and what kind of a rotation are we going to follow on that Clinton shale with the sweet clover? We are going to raise several crops of sweet clover seed and then turn down the sweet clover sod, either sow it with cowpeas, plant the land with corn and then seed it back to sweet clover and produce sweet clover seed and improve our land as time goes by.

Now my friends, probably here some of you would like to ask me questions and I would be very glad to answer them if I can.

ALFALFA AND HOW TO GROW IT.

By W. D. ZINN, *Phillipy, W. Va.*

I am always glad to get back into Pennsylvania. You have a great State, great because of its natural resources, greater because of its agricultural possibilities, and greatest because of the people, the citizens she has produced, and so I am glad to be here.

I have spent some 20 or 25 years studying alfalfa and experimenting with it, and you ask me to tell what I know about it in 30 minutes. Friends, I don't know much, but I cannot tell it all in 30 minutes, I could not give you my experience in 30 minutes, and so I will just have to touch the high places. I had intended to sandwich in a few stories, one or two that I thought were applicable, but I will have to cut them all out because we want to get down to the real meat in the cocoanut.

I want to call your attention, first, to the five essentials to successful alfalfa production, as I have classified it. First, drainage. Without well drained soil, my friends, you will fail in growing alfalfa; don't try it on a wet soil. This last season I thought my land was well drained and we had a continuous, almost continuous rainfall from the first of January until the first of April, and a lot of my alfalfa heaved up, some of it crawling out 18 inches long on land we thought was right well drained. The second essential is lime, and you had a talk on lime, so it is not necessary for me to elaborate on that, in fact I haven't time, but alfalfa is very hungry for lime. To grow a ton of clover requires about 40 pounds of lime. To grow a ton of alfalfa requires about 60, and if I may say so, alfalfa gets a pretty fair stand the first year and the second year it will turn yellow and die, and when we dig down to the sub-soil, we find the land is too sour to grow clover, the roots have penetrated the sub-soil and for that reason it turns yellow and dies and we lose it the second year. I remember having been invited to try an experiment on a farm over in our county, the owner of which was very wealthy. He took me out and at one end of the field he had a limestone soil, in the other end a sand soil, a soil that had been run very hard, and I said, "Mr. Raymond, let us go to the limestone field out there and grow the alfalfa." "Oh, shaw," he said, "anybody can grow alfalfa there; you claim to be an expert, I want you to grow it here, and I want you to take this 15 acre field and grow alfalfa on it." He said, "I don't care what it costs"—I will not use the term he used—"I don't care what it costs, you grow the alfalfa." I undertook it with fear and trembling, because the land had but very little organic matter in it, and he said, "Tell my manager what to do and he shall do just what you tell him." I said to the manager, "Apply four tons of ground limestone on this soil and turn it down," and he did so. and I said, "Apply four tons more on top of this land and work it into the soil," and he did so. Then I said, "Apply a thousand pounds of 16 per cent. acid phosphate to the acre on this land;" and he did so, and he worked it until the first of August, worked it thoroughly every two days, and he sowed 25 pounds of seed per acre and you just ought to have seen the alfalfa. It cost about $50 an acre to do that work and seed that ground down to alfalfa, but Mr. Raymond told me the next year, "That field brought me in an income of more than $100 an acre for the alfalfa." He was a dairyman and was buying alfalfa at $25 a ton and it cut him more than four tons to the acre. It was lime, largely, lime and phosphorus, that brought it there. Alfalfa is also very hungry for phosphorus.

The third essential is organic matter, and that was what that field did not have, and that is why I feared it so much. If you will follow the rotation suggested by the speaker who preceded me for a few years, you will get organic matter in the soil and be ready to grow alfalfa. but you are taking chances when you attempt to grow it on land that is low in organic matter.

The fourth essential is freedom from weeds. I have lost more alfalfa, friends, because of the weeds, because of blue grass—and blue grass is a weed in an alfalfa field, of course—because of the grasses and weeds, than from any other one cause, and we have only recently learned how to care for it until we purchased the alfalfa harrow and went over the field in February or the first of March, whenever we could find the ground dry enough, and then after the first cutting, harrowing both ways, and then again after the third cutting; until we did that, we lost alfalfa almost every year from weeds. You want the ground free from weed seeds. Intensive cultivation will do that.

The last essential is inoculation. Some of you are skeptical about inoculation, but you cannot afford to be if you want to grow alfalfa. You may have soils that will grow alfalfa without inoculation. Farmers have said to me, "I sowed alfalfa out in the field and didn't inoculate and I have a find stand." So you may have, sometimes you do, but you will fail, according to my observation and experience, about four times out of every five if you do not inoculate, and you cannot afford to take that risk. It does not cost much to inoculate, therefore I would say that inoculation is essential. At the Bethany College Farm in West Virginia, where I was carrying on some experiments a few years ago, I sowed one plot of ground without inoculation, and it was good rich soil, possibly not containing as much nitrogen as it should have had; then I sowed one plot with seed inoculation, using the cultures; then I sowed one plot with soil inoculation and then we sowed one plot with both seed and soil inoculation. Where did we get the best alfalfa? Where we inoculated both. What kind did we get where we did not inoculate at all? None. It came up, turned yellow and died. We had a farmer's day during that season and I told the farmers before we left the room what we had done there and I said, "I want you to point out the places we treated in that way," and there was no trouble finding the plots that had not been inoculated; it was a little trouble to find the plot that had only one inoculation. They said "Here is the finest alfalfa, there is where you must have put on a double dose of inoculation;" and it was so; inoculation is essential on most soils. I guess it is true that all seed carries on it more or less bacteria and you put it in the soil with the seeds.

MR. HERR: Is it practical to inoculate our seed by sowing alfalfa seed with clover seed.

MR. ZINN: Yes, sir, that is a practical way to do it: you will get the inoculation a little at a time in that way. If the soil had plenty of organic matter in it and consequently plenty of nitrogen, you could grow alfalfa without inoculation, you could grow it without bacteria at all. The reason we have to inoculate for alfalfa and soy beans and sweet clover—and I have had more trouble to grow sweet clover than alfalfa,—yet I know some farmers who succeed very well with it. If we had this nitrogen in the soil or if you will pile on nitrate of soda every year or two or three times a year, you could grow it without inoculation but you would not get much benefit from the alfalfa, you would not get the nitrogen out of the air. But if it has nitrogen enough in it to grow alfalfa until the bacteria is developed in the soil, you will grow it without any trouble. Now, having given you the five essentials, I want to speak just a little bit about the methods that I have followed on my own farm and which have been followed by those who grew alfalfa under my supervision.

A Member: What kind of a harrow do you use?

MR. ZINN: A spring tooth alfalfa harrow.

A Member: What difference is there between it and any other spring tooth harrow?

MR. ZINN: The teeth are very close together, turned around like a rod next to the ground and have a diamond-shaped point on the end and can be set with a leader. They tear up absolutely all the ground. I expect some of the farmers here have the alfalfa harrow.

A Member: How would the cut-a-way harrow do for the same purpose?

MR. ZINN: I tried it and almost ruined my alfalfa. I do not think that in our climate we can afford to split the crowns of the roots, I think it causes them to decay and I would much prefer using the spring tooth harrow.

A Member: Would a thin harrow serve the purpose?

MR. ZINN: Not very well, it is mighty hard to get grass out with a thin tooth harrow. I want to take up the different methods, I believe the best method to grow alfalfa is to prepare the ground, beginning to plow now or a little later as I did on Mr. Raymond's farm and cultivate that field until I should say about the last of July, possibly would be late enough, or the first of August we find will do in West Virginia, and then we sow the seed as I indicated we did on Mr. Raymond's farm, using a very heavy application of phosphorus, not always a thousand pounds to the acre, because we are not millionaires down in West Virginia, as Mr. Raymond was, but I believe that it will pay you to use 500 pounds of acid phosphate to the acre whenever you are seeding land to alfalfa.

A Member: How much lime did you put on to the acre?

MR ZINN: Eight tons; 4 tons on the top of the sod and 4 tons on the plowed ground. I would not recommend that to the average farmer, but Mr. Raymond did not care for the expense.

A Member: How much inoculated soil to the acre?

MR. ZINN: We say 300 pounds when we are writing someone about it, but if you have got an adjoining field, you'd better take the manure-spreader, set it to a spread of three loads to the acre and cover that field at that rate with the inoculated soil. That may seem extravagant, but I tried that for two years on some of my fields and when we started that spreader, as you all know, we would throw out piles of dirt there more than elsewhere. Each year you could go around in October and see where I started that spreader. I called the attention of my neighbors to it down there and I said, "There's simply more bugs there, that is the reason I do better there;" you can't get too much inoculation, and yet where you are having it shipped, three or four or five hundred pounds will answer the purpose.

A Member: What is your opinion of commercial inoculation with the soil in the hands of the average farmer?

MR. ZINN: I get better results from the soil than the commercial inoculation in my demonstration work. This last year we had a good many farmers to inoculate soy beans. Some of them failed entirely to get results. I am sure if you took the dirt from a field that was thoroughly inoculated and scattered it over and harrowed it in immediately, I am sure you would get good results that way, and so I am recommending that generally.

A Member: How much soil to the acre?

MR. ZINN: From 300 to 500 pounds ordinarily; more will be better if you can apply it.

A Member: How much alfalfa seed do you sow per acre?

MR. ZINN: We have to be mighty careful when we talk that, because we go over in Ohio and find some good authority saying 6 pounds to the acre, and in Ohio farmers are growing good alfalfa, some say 10 pounds, some say 15; I think the Station says 15 pounds. The New Jersey Station I think recommends 30 pounds; the Virginia Station, 30 pounds. I do not remember what your Station does recommend; our Station recommends about 20 pounds. I usually sow about 25 pounds of seed to the acre. Now if you will sit down and figure how much that is to the square inch, you will say, "Oh, there is no use using it," but some of that seed will fall in stony places, some of it will not germinate at all and some will be like some people that I have known, they will be too trifling to amount to anything after they do come up and will have to be crowded out by more vigorous plants; and so I want to cover the ground pretty well. I am criticised for recommending 25 pounds of seed to the acre, but we are doing it.

MR. SEEDS: Won't the percentage of the germination of the seed have a great deal to do with it?

MR. ZINN: Yes, sir, and the purity of the seed, so you cannot lay down any hard and fast rule as to the number of pounds you would apply; I do not believe that I would risk less than 15.

A Member: What is your opinion of the Iowa Station recommending scarified seed?

MR. ZINN: I have not found it necessary for alfalfa.

A Member: Have you made any experiment with it?

MR. ZINN: Some few. Where the seed has a high percentage of germination we have but very little trouble. I think it is necessary to scarify the sweet clover seed and some others we have been growing.

A Member: Where did you get your alfalfa seed?

MR. ZINN: Well, we buy it from various places, generally South Dakota is where I have been getting my seed more recently; I don't know that I get any better seed there than in some other places, but I feel that it is more likely to be raised there than in the east.

A Member: Did you ever buy any from Kansas?

MR. ZINN: No, sir.

A Member: Did you ever sow down alfalfa with oats?

MR. ZINN: I am coming to that. I prefer the beardless barley to the oats; I think you will get better results, for the reason that the oats will cover the ground and seem to have more blades than the beardless barley; if you will cut those oats for hay and beardless barley for hay, you will stand a pretty good show for getting the alfalfa. Last year I sowed rye for hay and that part of the field had produced alfalfa before I cut the rye and I made about three tons of rye hay to the acre and we got an elegant stand of alfalfa in the rye but scarcely any in the wheat, the wheat killed the alfalfa. That brings up a method I have followed of sowing rye in the fall. In West Virginia we are growing a lot of rye hay and we think a great deal of it, because you can get off a crop of clover and timothy or two of alfalfa the same year. We sow about a bushel and a half of rye to the acre, and about the first of April we put the lime on, put the lime on in the spring before we plant the corn, if possible, and then fertilize the rye with about 200 pounds of acid phosphate and about the first of April, whenever the ground is in condition—we did not find it in condition this year and got our rotation disjointed and we have to sow soy beans where we wanted to have alfalfa growing at this time and could not sow it at all, but we sow the alfalfa seed, put it in in the first place with a disk drill, alfalfa and clover seeder, which is a very useful instrument, and then go on with a spike tooth harrow, sometimes harrowing both ways. I told my men to harrow until they think the rye is growing and harrow it across the other way. We cut the rye just as it comes in head and have been able to cut two or three crops of alfalfa the next season. If we leave out the next winter, we are way ahead in the game and I have been recommending that method of seeding the rye. Sometimes you will fail just as you will when you sow the last of July or the first of August, but we have found that method very dependable.

I believe then that the thing for the amateur farmer or alfalfa grower to do is this, mix one-half alfalfa with one half clover Ten pounds of each, seed the rye, seed whatever you are going to put in, down in that way, and if you get a ton of alfalfa and you will with 10 pounds if it comes well, in two years anyhow the clover will have disappeared and you have your alfalfa. We tried that at the College, the Bethany College farm, two or three years ago and got a very fine stand of alfalfa that lasted for several years after the seeding. You have not lost anything; you have inoculated the soil, and if you fail to get alfalfa the next year, you have it ready to sow alfalfa the next year.

A Member: Do you use medium or red clover?

MR. ZINN: Red clover is what I use all the time. If I am sowing clover in an acid soil, I use the Alsace; if I am sowing with timothy, which I rarely do, I would then recommend the Mammoth clover.

A Member: What proportion of alfalfa and clover do you use?

MR ZINN: Ten pounds of each; 10 pounds of medium red and 10 pounds of alfalfa.

A Member: Do you sow it in August?

MR. ZINN· Yes, you might sow it in August in the same way. I have never done that; I always sow it in the spring, in wheat and rye, and I have now the finest field I think I have ever had on my farm, and I sowed last April and April a year ago, and that is what I intend to do this season. You possibly might not be able to sow here until the 15th, perhaps, but you ought to get it in pretty early, the weeds will come in May and June; I do not think anything of May and June for sowing alfalfa, the weeds are coming so abundantly that it is apt to clog the alfalfa out. I would be glad to have questions. I have hurried over this, because I was afraid I would be called down before I got through, but I have about covered the subject.

A Member: Do you sow spring rye or winter rye?

MR. ZINN: If I was sowing in the spring, I would certainly sow spring rye. Last year I had a farmer to sow winter rye in February and it did very well; another farmer sowed winter rye because he couldn't get the spring rye, in April, and it simply covered the ground and died about the time the rye should have ripened, and never grew up at all and ruined the alfalfa.

A Member: How about Grim seed?

MR. ZINN: If you can get it, I guess it's all right; it's mighty hard to buy.

A Member: You talk about sowing a bushel and a half of rye; what kind of soil had you when you sowed that?

MR. ZINN: Do you mean how fertile?

A Member: Did you have limestone soil?

MR. ZINN: No, sir, it is a sandstone soil and land that will produce fifty to seventy-five bushels of corn to the acre, pretty well limed. We are using that amount of seed on nearly all our land in my county. We sowed last season more than four thousand acres of rye for hay, and I am sure last week we harvested more than a thousand acres of rye hay in that county; some farmers report that that makes three tons to the acre; I saw quite a number of fields where I am sure they made over two tons, and we are finding it is just about as good feed as timothy; it analyzes, as some of you know, a little better than timothy; timothy analyzes 6.8 per cent. protein, and rye hay 10.8 per cent.; it is probably not quite as digestible.

A Member: Isn't your rye apt to smother out the alfalfa in the spring?

MR. ZINN: Not a bushel and a half; we cut it as soon as it comes in the stalking to head; the stalking is all over before that time. In very rich land I did notice a garden spot that had been sowed down where the rye was really too thick for the alfalfa and the farmer lost his seed, I think by sowing it.

A Member: If I understand you properly, you spoke about fall sown rye seeded to alfalfa and disked two ways?

MR. ZINN: Yes, sir, we sow it in the fall and then harrow it; we do not use the disk. We use the disk drill, but only disk it one way and then harrow it afterwards. Sometimes we find it necessary to even harrow it if the ground is very loose and disk drill it, covering it pretty well, we let that suffice; if it is hard, we go over it twice.

A Member: Don't you believe that the application of acid phosphate or some other phosphate fertilizer is important enough to be considered one of the essentials for successful alfalfa production?

MR. ZINN: Yes, sir, I should have added that.

A Member: I understood you to include organic matter?

MR. ZINN: Yes, sir, but I would not sow a square rod of alfalfa without using a pretty heavy application of phosphoric acid of some character.

A Member: I have in my mind a crop that has been out a couple of years; wouldn't it be advisable to put more lime on when you cultivate it after the mowing?

MR. ZINN: Yes, sir, we often go over our alfalfa fields and relime them—the permanent alfalfa.

That brings up another point that has not been asked here, that is about thickening up a stand of alfalfa; have you had trouble that way, friends? I guess you have; those that have been growing alfalfa. I am not sure that I have a remedy; I think I have; I visited a farmer sometime ago; he had an elegant stand of alfalfa. I said, "Tell me how you got this." He said: "I sowed it and only got a partial stand; the next year, after the second cutting, I went on to it and sowed nearly as much again and harrowed it in thoroughly. Why did I do it after the second cutting? Well, I just happened to;" I said; "I believe I see the reason; after the first cutting, if you had sown it then, the growth would have come on rapidly, and being a good growing season, it would have been cut off by the machine at the second cutting; when you cut it the second time, vegetation was not growing so rapidly, the alfalfa did not get so high and you did not cut it off; at the third cuting, it had all the fall and spring to grow and made a crop the next year." I think there is the trouble, that you will cut it off, if you don't sow it the second time. I am not sure that will work every year, but it did in this instance. Have you any other questions?

A Member: One of the chief difficulties in Lancaster county in growing alfalfa is after they cut the first crop, the second crop coming up will turn yellow on ground that has been in alfalfa five or six years, that has been limed, has good drainage, has been inoculated, but our chief trouble has been the plant turning yellow on fertile soil, we will get the first crop but not the second.

MR. ZINN: Do you know whether that is a kind of a rust or not?

A Member: I don't know what it is, but we don't get the crop.

MR. ZINN: If the soil is thoroughly inoculated, well drained, has plenty of lime in it, the alfalfa should not turn yellow unless that rust peculiar to alfalfa strikes it, then all you can do is to cut it, and I even take the chances of cutting it before it is ready to cut, before the sprouts start, if it gets yellow, because it will never make any more growth, and I remove every particle of that rusted alfalfa from the field.

MR. HERR: It has been the universal complaint in our county.

MR. ZINN: I guess you noticed carefully the leaves, to see whether there are not dark spots on them; if you find those, why the alfalfa has that rust.

A Member: Regular rust has been very common in the State.

MR. ZINN: I cannot see why this alfalfa should turn yellow, unless it is rust.

A Member: I had that same trouble with rust on alfalfa.

MR. ZINN: I think we all have, who have been growing alfalfa.

A Member: I sent a sample to State College and they said it was rust. We cut it regularly and it came on all right the next time.

MR. ZINN: That happens quite frequently; we should not be discouraged if we fail ten or twelve times in growing alfalfa; they did that in Kansas. Send to F. D. Coburn, Manhattan, Kansas, for his little book, costing 20 cents, and you will find a statement to that effect. They grow it there now so they can't rest at night, they have got to harvest it night and day to get it off for the next crop to come on—so the Kansas boomers say. I heard Dr. Lipmann a few years ago, in New Jersey, make this statement, that the character of the soil did not count much in growing alfalfa. I thought to myself when I heard it "you are making a pretty strong statement," but I have gone over Virginia, Kentucky, New Jersey, Ohio and Indiana and have seen it grown on all kinds of soil. Naturally

I prefer, because I had more success in growing alfalfa on it, the heavy clay soil, but I have seen it grown on sandy soils and on all characters of soils. I believe that Dr. Lipmann was right ten years ago when he made the statement—I think it was that long ago when he said, "You can grow alfalfa anywhere if you get the conditions right," and those conditions are some of the things I have already named.

COMMUNITY BREEDING.

By HELMER RABILD, *U. S. Dept. of Agriculture, Washington, D. C.*

I wish to express my pleasure at being permitted to be here with you to-day. I have had the privilege in the past of doing a little institute work in this State, and I was very sorry last winter that the press of other work prevented me from filling an engagement which the State Department of Agriculture tendered me. I am especially pleased to have the opportunity of presenting this subject of community breeding before you men, for I realize that a large share of the advancement of agriculture in this State has been due to your earnest and untiring efforts.

Pennsylvania is one of the oldest and has always been one of the leading dairy states. According to the census of 1910, it is exceeded in total value of dairy farm products only by New York and Wisconsin. The total value of dairy products sold is $44,852,066. In number of dairy cattle Pennsylvania ranks seventh, with 933,640 dairy cows on farms. These dairy cattle were reported on 191,174 farms, which gives us a theoretical average of 4.9 cows per farm. Thus we find, if these data are reliable, that the average annual income from Pennsylvania cow is about $48.

It is impossible to say definitely what the average production per cow is in Pennsylvania. If we use the census figures we find that the average production is only 441 gallons per cow, or about 3800 pounds. It should be said, however, that the number of cows taken to give this average includes all cows and heifers kept for milk 15½ months old and over, and consequently includes quite a large number of heifers which have not yet freshened. If we assume that 6½ per cent. of all the dairy cows enumerated by the census were heifers which had not yet freshened, we arrive at an average production from the balance of them of about 4100 pounds of milk, and 165 pounds of butterfat.

The average production in 12 cow-testing associations in Pennsylvania, comprising 5000 cows, is not far from 5900 pounds of milk, or 246 pounds of butterfat. Some of this high production is undoubtedly due to the methods of cow-testing associations for we find that as soon as an association is organized the yield increases materially. The herds of cow-testing associations probably represent better and better kept herds than the average of the State.

This ratio of the production of untested herds to that of tested ones agrees fairly closely with that found in European countries, so a figure of 165 pounds of butterfat is probably as close to the average marketed production of the dairy cows in the State as can be calculated. In addition to this amount, some dairy products are consumed on the farm. I am constrained to believe, however, that the average consumption of dairy products on the farm is not very large, at any rate not nearly as large as they should be. On quite a number of farms butter is used quite sparingly because it has a market value, and quite frequently only a small pitcher of whole milk or cream is saved every day for the farmer's table. If I had the time I should like to have dwelt a little on this point, for I see no reason why the farmer should not have an abundance of dairy products for home consumption. I should like to see more whole milk consumed on the farm and I am sure that in many instances such things as cottage and neufchatel cheese would be welcome additions to the farm diet. I would like to see more dishes made with milk because of its wholesomeness and its value in the diet,—but I am straying from the subject.

Because of the high average production in cow-testing associations it would seem that if it were possible to form all the owners of dairy cows in Pennsylvania into cow-testing associations the average production per cow would, in the course of a very short time, be materially increased. Unfortunately this is not possible. You will remember that the average herd in Pennsylvania number less than five cows. Probably not more than 20 per cent. of the cows in Pennsylvania are owned in herds of sufficient size to receive the benefits of cow-testing association organization, since such organization requires herds of 12 cows or more. If my estimate is correct, the remainder, or four-fifths of all the dairy cows in Pennsylvania, are owned in herds of less than 12 cows. It seems to me that we can not hope to have any great improvement in the average production and the net profits unless we can devise some simple and feasible means whereby the owners of the four-fifths of the dairy cattle in Pennsylvania may be enabled to improve their stock. I believe some form of community breeding will offer such a means.

It is only in the last few years that we have heard about community breeding of dairy cattle as an idea worth considering in connection with plans for the advancement of our dairy industry. It may be doubted, however, whether community breeding as an original idea was ever the product of a human brain. The separation and perfection of the original types of cattle into recognized dairy and other breeds has taken place within the last 200 years, and is largely, if not altogether, the result of community breeding.

The first separation of the original cattle into varying types came undoubtedly as a result of varying rigors and vicissitudes of natural conditions. Later, considerations of food and comfort caused certain men and communities to become interested in certain distinct types of cattle, and by their planning of the breeding and weeding of the cattle they took over the work of an all-wise but slow Nature, and hastened this work toward perfection along lines specially adapted to their selfish ends. Transportation facilities and means of communication were crude, and there was little intercommunication between the various cattle-raising communities, and consequently little opportunity for intermixture of the blood of the cattle of different communities.

This community breeding is responsible for the development of the breeds of dairy cattle of to-day, but it is only in the last few years that nature has had the satisfaction of knowing that our eyes have at last been opened to the benefits to be derived by following the paths along which she has, by her work, endeavored to direct us. Even such outstanding examples of the benefits of community breeding as are offered by the history of the cattle industry of the Islands of Jersey and Guernsey have, until recently, wanted for appreciation.

I should be amiss in my duty to the historian of this subject should I fail to mention that organized community breeding found its first exponents in the little kingdom of Denmark, where the first community dairy-cattle-breeding-association was formed in 1874, and where there are now more than 1100 associations, with about 30,000 members.

In the United States organized attempts to foster community breeding of dairy cattle did not begin until about 1906, when a Guernsey breeders' association was organized at Waukesha, Wisconsin. As this probably marks the beginning of such work in this country, a review of the activities of the association by its secretary, Mr. Gavin McKerrow, will be of special interest. Mr. McKerrow states:

"The Waukesha County Guernsey Breeders' Association was organized in 1906 in Waukesha. It was organized by a few young men who saw the possibilities of community breeders' association work. At that time there was some Guernsey interest in the county, and in 1906 the census was taken, which showed that there were about 266 pure bred and 500 grade Guernseys in the county. This organization has from the outset featured two lines of development; First, the improvement of home conditions, including an organized effort for the increase of Guernseys in the county; secondly, to aid in the marketing of the stock and dairy products of its members.

"The influence, on conditions in the county, of the semi-annual meetings has been an important feature. Every year since the organization of the association a winter meeting and banquet have been held in the city of Waukesha. These meetings are something more than a business gathering, and are considered of first value as an educational and social force, by the most prominent business men and farmers in the county. The very highest class of speakers on agricultural topics have always been obtained. The association has been especially fortunate in having Rest Haven, one of the finest small hotels in the Middle West, as the place for its winter meetings. From 200 to 300 people are banqueted annually at this hotel by this association. The annual summer meetings are held at the farm of some of the members. Public interest in the summer meetings may be illustrated by the fact that we had 550 present. The influence of these meetings on the increase in number and quality of the Waukesha County Guernseys has been marked.

"In 1912 another census in Waukesha county was taken, and it was found that there were about 1500 pure bred Guerseys. At present I should estimate the number to be about 2000. The quality of

Waukesha county herds has risen considerably during the last six years. This has been evidenced not only in the show ring but also in the advanced registry work. In two years the Waukesha county record for butterfat production has risen from 649 to 846 pounds. The interest of the breeds in our association work is well illustrated by the fact that each member pays annual dues of $3. There are 150 members in the association, and every man pays his dues every year or ceases to be a member.

"Along the lines of marketing the association has attempted to follow a square-deal policy, and to establish a reputation on this basis which will be lasting. Annual sales have been held for seven years with the strictest rules regarding health and reliability of the animals sold. This has been especially true for the last three years. Considerable advertising through the agricultural press has been done co-operatively by the association. These funds have been raised and distributed under the supervision of the board of directors. This has meant a uniform type of advertising."

The little town of Lake Mills, Wisconsin, is another example of what may be accomplished in community breeding. The early efforts of a few men in this community along the line of breeding Holstein-Friesian cattle resulted in the community acquiring a reputation for that breed. There was no local organization to foster this interest, but in a few years the community had acquired the name of being the greatest Holstein center in the Middle West, and buyers come there from all parts of the world to buy Holstein cattle. The breeders have been unable to supply the demand for stock, and have sold as high as $175,000 worth of cattle in one year.

Those of you who have had occasion to inquire where good Holstein cattle could be secured in large numbers have, I am sure, been referred to Livingston County, Michigan. That county has 237 breeders of pure bred Holstein cattle, the majority of whom are affiliated with one organization. The association issues a booklet which contains a history of the association and the advertisements of the several members. The county claims to have the largest number of breeders of pure bred Holsteins to be found in any one county in the United States. A drover who has traveled this section for many years states that the fertility of the land has doubled during the last ten years. Silos and good dairy barns are now prevalent.

One advantage of the combining of farmers to raise one breed of cattle is the market created. Buyers from abroad recognize the advantage of having a number of herds in easy reach from which to draw, and if one man has not a sufficient number, his neighbors will very likely complete the order. There is already almost a continuous string of cattle leaving the county—singly, in small lots, or in car lots. The breeders use up-to-date methods; no pains or money is spared to produce the best sires the country affords; and while every effort is made to maintain the high reputation of the cattle for constitution and vigor, the production records must please the prospective buyers. One of the best results achieved is the development of a co-operative spirit in the community, which reaches out into many other lines of agricultural activity besides improved livestock breeding. One hundred and twenty-five breederse in Livingston county have 2500 Holstein cows, which are estimated to be worth $750,000.

These associations are simply composed of breeders of pure bred cattle, who band themselves together for the advancement of the breed, and who have especially agreed to keep pure bred Holstein bulls. So well, however, has this organized effort in the interest of the breed succeeded that these communities are now known as centers for the cattle of that breed in which the association has taken a special interest.

But it is not necessary for me to convince you of the advantages of community breeding. To you they are already apparent. Community breeding harmonizes the minds of men and centers them on one project. It increases the interest in their work, and a friendly competition is bound to result. It stimulates study of the characteristics and possibilities of the breed, and of the business. Many animals of the same breed found in one section of the country soon establish that section as center for the breed, and thus a market is created. When such a reputation has been established, the current prices of cattle usually run higher. Community breeding makes it possible for a farmer to secure in his own community such breeding stock as he needs to buy. It also gives opportunity for the exchange of bulls, thus saving money and at the same time securing bulls which have proved their merit.

In spite of all these advantages, community breeding, as an organized effort, has not made great strides in this country, and I believe it is largely because we have had no well defined plan for bringing it about. It is not enough for everybody in the community to keep the same breed of cattle. That alone is not community breeding. If it was we would see the value of community breeding prominently exemplified in the South, where nearly everybody keeps Jersey cattle but the South has not led other sections in the development of Jersey cattle. The same is true about the territories adjacent to our large cities where Holstein-Friesian cattle predominate. While the great majority of the farmers keep Holstein-Friesian cattle there has been little development of the breed in such centers.

In order for community breeding to be of greatest value, it must take the form of an organized effort, as a community, to further the interests of that particular breed. The Department of Agriculture has given years of study to this problem, and in 1908 organized a breeding circuit in North Dakota for the purpose of studying in detail some of the problems in connection with this work.

About that same time, Dean R. S. Shaw, of the Michigan Agricultural College, presented a plan of community breeding which has proven quite successful. This plan was, in brief, the organization of what is called a co-operative bull association for the joint ownership of pure bred bulls. The first association of this kind was formed in Michigan in 1908. The next year four more were organized and the year after that three were organized in Michigan and one in Minnesota. From this small beginning the work has grown until we now have approximately 30 bull associations. The Dairy Division early took up this work, and now has a specialist who gives his entire attention to a study of the operation of these associations and the organization of new associations in different sections of the United States. The following table shows the number of dairy bull associations in operation July 1, 1915:

DAIRY BULL ASSOCIATIONS IN OPERATION JULY 1, 1915

	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Michigan,	1	4	7	6	10	15	15	14
Minnesota,	....	1	1	1	1	2	2	2
North Dakota,	....	....	....	....	1	2	1	1
Maryland,	....	....	....	....	1	1	1	1
Vermont,	....	....	....	....	....	....	1	1
Wisconsin,	....	....	....	....	....	....	1	1
Connecticut,	....	....	....	....	....	....	....	1
Maine,	....	....	....	....	....	....	....	1
	1	5	8	7	13	20	21	22

Approximate number of cows,	3,600
Approximate number of bulls owned by associations,	90
Approximate number of members,	540

You will remember that I mentioned earlier that probably four-fifths of all the cows on farms kept for milk in Pennsylvania are owned in herds of less than 12 cows. Let us consider, if you please, the conditions which prevail in such a small herd, especially with reference to its improvement. Say, for argument's sake, that the herd consists of about 8 cows. The owner, manifestly, can not be induced to keep a pure bred bull of sufficient quality to improve the stock. Such a bull would cost him about $150. If we assume that he keeps this bull two years and then sends him to the block and buys another bull, his bull service will have cost him $150 for the two years. It is true that the bull has some beef value at the end of the two years, but this is offset by the cost of his keep. In other words, it would cost this man $75 a year or about $10 per cow for bull service, and if we assume that one-half of the calves are heifers the cost of bull service per heifer calf comes to about $20, which, of course, is prohibitive. The consequence is that a man under these circumstances generally does not keep a bull, but breeds to his neighbor's bulls, and I think you will agree with me when I say that the usual custom in a herd of this size is to breed the cows to the nearest and handiest bull, which may be a Holstein one year, the next year may be a Guernsey, the year after that a Shorthorn, and in other years what not? It is this condition which, to my mind, is largely responsible for our low average production, because under it very little improvement in the stock can be made in small herds.

The plan of a bull association makes it possible for the owners of such small herds to have the services of the very best bulls at a very small cost. A co-operative bull association is an organization of farmers owning small herds, primarily for the joint ownership and use of pure bred bulls of the same breed. In its simplest form an association may consist of three farmers, who together purchase three bulls of the same breed. Each of these farmers keeps one of these bulls on his farm for two years, when the bulls are exchanged.

Thus each member in the organization has the use of a pure bred bull for six years, for an initial investment equal to the cost of one bull. While this is the simplest form of a bull association the membership usually ranges from 5 to 60, and the bulls owned from 3 to 18. The association divides its territory into what are called breeding blocks. Each of these blocks contains from 40 to 60 cows. An association bull is stationed in each block, where he remains for two years for the service of the cows in that block. At the termination of this time in order to avoid inbreeding, each bull is exchanged for a bull of another block.

The investment required, which places within reach of each member a pure bred bull, varies from $20 to $60 per member. It is usually the case that there are enough scrub bulls in the community in which a bull association is formed, so that the scrub bulls, if sold for $50 each, will bring enough money to buy pure bred bulls for the farmers at the price of $150 to $200 each, when the farmers are organized in a co-operative bull association. In other words, the co-operative bull ssociation makes it possible to have pure bred bulls instead of scrub bulls without any extra investment of money. Fewer bulls are owned, and thus the cost of keep is materially reduced, and instead of buying new bulls every two years to avoid inbreeding, the initial investment furnished bull service for six years or more. It is the quickest way for any owner of a small herd to get into pure breeding, for it strikes at the very worst obstacles in his way, namely, the cost.

To illustrate: Three farmers with one scrub bull each can raise $150 by the sale of these animals, and $150 will usually buy a good pure bred bull, especially if the three men will use a little foresight and buy a young animal, or look around and find an older herd bull which must be discarded from the herd where he is in order to avoid inbreeding. Or, suppose that 25 farmers, owning 250 cows, club together and form a bull ass ciation with 5 blocks and buy 5 bulls at $200 each, making a total investment of $1,000. Generally there are enough scrub bulls kept by these members so that when sold for beef enough money can be raised to buy the five good bulls. This represents a total investment of $1,000, or about $4 per cow. At the end of two years the bulls are rotated. If none of the bulls die or otherwise get bad they will have bull service for ten years at the initial cost of about $4 per cow, or 40 cents per cow per year.

One of the great benefits of bull associations is that it is possible to get a line on the value of the bull. Generally, no matter how good is the selection of the bulls, there will be one, and perhaps two of them, which will prove unsatisfactory and will have to be replaced by better bulls at the end of the third or fourth year. The bulls which do not produce good offspring will, in an association, be detected as soon as the progeny comes in milk and can be disposed of. At the present time a man buys a bull and uses him for two years when he disposes of him and buys another bull. Not until the heifers get in milk does he know definitely the value of a bull, and many famous bulls have been slaughtered before their outstanding breeding value was known. In a bull association such outstanding values get just recognition after the bull has been in the service two or three years and he is saved to perpetuate his good qualities to a much larger number of animals.

As mentioned before, the bulls are stationed in what are called breeding blocks, that is, in a place central to the farmers in that particular section of the association. Quite often one of the farmers of that block agrees to feed and care for the bull free of charge to the association for the convenience of having the bull on his own farm, and in that way the cost of keeping the bull is taken care of.

One of the first thoughts that has occurred to you in connection with this proposition, I am sure, is that contagious abortion will make it impossible to operate these associations. In our investigations, however, we find that this danger is a minor one, as far as the life of the association is concerned. In fact, conditions just as dangerous to the breeder are found where there is no organization. Examples of such conditions are found in the promiscuous breeding to neighbors' bulls, the buying of cows from herds where no knowledge of their health can be had, and the general cloak of concealment which exists where there is no organization. On the other hand, the co-operative bull association can be made useful as a weapon with which to fight contagious abortion; because every one of the members is alive to the danger of spreading contagious abortion, they watch the health and treatment of the bull with zealous care; and of the bull associations organized in the United States only one has disbanded, so far on account of contagious abortion.

One of the greatest difficulties in the way of the progress of bull associations at the present time is our lack of information concerning bulls; the production of bulls, dams and granddams and lack of systematized information concerning certain lines of breeding. The scientist, as well as the practical breeder, tells us that in order to attain the greatest development in the upbuilding of a herd we should follow line breeding. And where, for instance, would you go to-day to pick up five good bulls of the same line of breeding for a bull association? We hope, however, to be able to deal with this matter successfully and are now studying the records of a large number of animals of the various dairy breeds in an effort to get just such information as we need concerning the productive value of the various strains.

You are, I am sure, acquainted with the splendid progress made by the cow-testing association movement. I think I am safe in predicting that on July 1, 1916, there will be 330 co-operative cow-testing associations in operation in the United States. I also believe there will be just as great a growth in the development of bull associations during the next ten years as there has been during the past ten years in the cow-testing association movement. It is a line of work which is especially adapted where the herds are small, and because of the large number of herds of this character I feel that it is very important work for us to undertake.

If any of you are especially interested in the details of the organization we shall be glad if you will write us and we will send you a tentative outline of constitution and by-laws for such an association.

FEEDING THE DAIRY COW.

By A. A. BORLAND, *Professor of Dairy Husbandry Extension, State College, Pa.*

It has been said that the darkest of all dark places is the inside of a dairy cow. If we could turn on an electric light bulb in the inside of the body of the cow and watch the processes taking place there, we would be interested to note the wide variation in the uses to which different cows devote their food. Some animals seem to place the larger portion of their feed upon their bodies in the form of fat, others send it to the milk pail, while still others use it neither for body fat nor for milk but waste a large amount by their restlessness and nervous activity.

THE RESPIRATION CALORIMETER

The most exact method of determining what the animal does with its food is by the use of the respiration calorimeter. This is a large compartment in which the animal may be closely confined and accurate data obtained as to the kind and amount of all the chemical elements supplied. The food is carefully weighed and analyzed, as is also the air which the animal breathes. This, the entire intake is accurately accounted for. The outgo is likewise determined. The excretory products are weighed and analyzed and the amount of heat or energy in the feces, urine, methane gas, breath, perspiration, and heat given off by the body is carefully computed. In this way the value of different foods is determined in terms of the energy they contain or are able to liberate when consumed by the animal. While these determinations are still far from being complete, since the apparatus is costly, the number of calorimeters are few, and the amount of mathematical and analytical data involved is exceedingly large, yet investigators both in Europe and America have proceeded far enough to bring out facts of great interest and importance.

THE ANIMAL BODY AS A MACHINE

This method of determining the service of different foods to meet the needs of the animal takes into account the likeness of the animal body to a machine, such as a gasoline engine which requires both repair materials and fuel. The food substances which constitute the repair material for the animal body are water, ash, and protein, while carbohydrates and fat serve as a fuel supply, being largely burned up in the body to furnish heat and energy to run the animal machine. If more carbohydrates and fat are supplied than is necessary for the immediate use of the animal, the surplus may be stored up as reserve fuel in the form of fat. The following table gives the proportion of the different classes of nutrients entering into the average composition of the animal body and of milk.

DIFFERENT CLASSES OF NUTRIENTS

Use.	Nutrients.	Composition of animal body.	Composition of cow's milk.
Repair material,	Water,	56%	87.1%
	Ash,	5%	7%
	Protein,	18%	3.5%
Fuel,	Carbohydrates,	21%	8.7%
	Fat,		
		100%	100.0%

It is evident from the table that water is an important food substance making up 50% of the animal's body and over 87% of milk. It is the writer's belief that many dairymen lose sight of the importance of water as a food substance. When we stop to consider the large amount of water required by the dairy cow yielding a liberal amount of milk, it is plainly evident that not a few dairymen are losing milk by not supplying the cows with a sufficient quantity of water. Especially is this true in the winter time when some farmers turn their cows out in the storm and cold winter wind to go perhaps 500 yards down to a pond or brook, from which the ice must be broken before the cows are able to drink. Under such conditions, cows will usually not drink as much water as they would under more favorable circumstances and the result is a lessened milk yield. For the same reason, that is, the supplying of unstinted quantities of water to the dairy herd, the writer believes that it is worth while to water cows twice a day rather than once. In conversation with a prominent dairyman, the writer found that he had secured from his herd over 30 pounds of fat more per cow the past year than during the preceding year. Upon being asked the reason for this marked increase the dairyman replied that his judgment it was largely due to the fact that he was giving his cows more water than during the preceding year. He stated that the last thing he did before going to bed was to go out to the barn and give the cows each a pail of water. Since he had culled out no cows and was feeding no more feed than the preceding year the increased supply of fresh water was in his estimation the thing that counted for the increased yield. Since, however, water may be abundantly supplied in the drink, it need not be considered in the discussion of rations, except to emphasize the importance of a clean and plentiful supply.

Ash or mineral matter making up 5% of the body and .7 of one per cent. of milk, is seldom deficient in normally constituted rations. Clover, alfalfa and other leguminous plants are rich in ash. This is one reason why they are so valuable for young growing animals, since large quantities of mineral matter are needed by young animals for the growth of the skeleton.

Water and ash are usually sufficient. Protein on the other hand is apt to be deficient in the ration, made up largely of farm grown grains and roughage, and since protein is an especially important nutrient making up 18% of the animal body and 3½% milk, and entering largely into the composition of the muscles, hair, hide, hoof and horns and the vital organs of the body such as the heart, lungs, liver, brain and nerves, it is important that a sufficient amount be supplied to keep the organs of the body repaired. Nitrogen the characteristic element of protein is lacking in the other nutrients, hence, the animal body cannot manufacture protein from the other nutrients. On the other hand, protein will, to some extent take the place of carbohydrates and fat. An insufficient supply of protein fed to young animals checks their growth and development. Upon dairy cows the result of such feeding is seen in lessened milk flow and in long continued cases, the breaking down of the animal body. An excess of protein is likewise of no benefit to the animal, since the body does not store up superfluous protein but excretes the excess nitrogen through the urine. In fact, an over abundant supply of protein is a decided damage to the animal in that the excretory organs are simply worked over time, in getting rid of the excess nitrogen.

The fuel substances—carbohydrates and fat—make up 21% of the animal body and 8.7% of milk. These substances may be regarded as reserve fuel material stored up in the body, somewhat similar to the supply of gasoline carried along with the automobile to furnish the energy to run the machine. The unit of measure for the fuel, or energy value, of a feed is the "therm," which is the amount of heat required to raise the temperature of 1,000 pounds of water 4° F. If insufficient amounts of carbohydrates and fat are supplied, the animal becomes reduced in flesh and is finally forced to burn up expensive protein as fuel, which ought to be supplied by cheap carbohydrates. The feeding of excessive amounts of carbohydrates and fat, make a fat animal but does not increase the milk yield.

MAINTENANCE AND MILK

The question naturally arises as to what portion of the food is required to make good the wear and tear that is constantly going on in the animal body—the maintenance requirement— and what portion is available for milk production? The answer to this question depends upon the amount of food supplied to the animal. The amount of food that must be used to maintain the body depends upon the size of the animals and is practically a fixed quantity being the same from day to day regardless of whether little or much food is being supplied. It is evident, since the maintenance requirement is a fixed amount, that if only a small quantity of food is furnished, the animal must use most of it for maintenance and but little will be left for the manufacture of milk. On the other hand, if plentiful supplies of food are given the animal the percentage of it that is used for maintenance is much smaller than when the food supply is limited. This explains why the milk yield is much greater and the food cost of producing a quart is less with well fed cows than with an underfed herd. It likewise follows that animals may be given more food than they can profitably utilize for maintenance and milk, in which case the animal machine is not being handled at its maximum efficiency. The following diagrams, showing what becomes of the feed given a cow weighing 1,000 pounds and normally producing 20 pounds of 4% milk, will illustrate the point. It will be apparent that the proportions would vary according to the size of the cow, and the amount of milk being produced.

FED TOO MUCH

Maintenance, 40%.	Production, 40%.	Stored up, 20%.
1000 pound cow.	20 pounds 4% milk.	Gain in weight.

JUST ENOUGH

Maintenance, 50%.	Production, 50%.	
1000 pound cow.	20 pounds 4% milk.	

TOO LITTLE

Maintenance, 66 2/3%.	Production, 33 1/3%.	
1000 pound cow.	10 pounds 4% milk.	

In the first diagram where the animal is fed too much, it is evident that 40% of the net energy in the food is used to maintain the body of this particular cow; 40% is used in the production of 20 pounds of 4% milk; and the remaining 20% is stored up as gain in weight. It should be remembered in this connection that while excess carbohydrates and fat go to make gain in weight, an excess of protein is largely lost to the animal so far as useful purposes are concerned since the excess nitrogen is excreted through the urine. When fed this ration the animal is not working at maximum efficiency since the amount of food supplied is more than can profitably be utilized for maintenance and milk.

The second diagram illustrates what takes place in the animal body when the proper amount of food is supplied. In this particular case 50% of the net energy in the food is used to maintain the body and 50% is used for milk production. With this amount of feed the cow evidently works at the highest efficiency since a greater percentage of the feed goes to milk production than in either of the other two cases.

The third diagram shows that when this cow is underfed she must use the same amount of feed for maintenance as in the other two cases but in this instance of proportion of the total ration going to maintenance is 66⅔% leaving only 33⅓% for production. This amount is only sufficient for the production of 10 pounds of 4% milk. Evidently it does not pay to underfeed a cow, since the cut in the ration comes entirely on that portion that formerly went to make milk. By the diagram it may be seen that reducing the ration only ½ from the amount that ought properly to be fed, leaves only half as much food as normally for milk production. When a dairyman goes to the trouble and expense of supplying the food for maintenance it is poor economy to withhold the other half that would ordinarily be used to purchase milk. As a matter of fact it has been found through experiment and also through the data gathered by Cow Testing Associations that the cows eating large amounts of feed usually yield large amounts of milk and much higher net profits after the feed bills have been paid than do smaller eaters. The amount of milk produced is usually in direct proportion to the amount of feed consumed over and above the maintenance requirement up to the limit of the cows ability to produce milk.

FEEDING STANDARDS

How then shall one know when a proper amount of feed is being supplied the dairy cow? A good general rule is to regulate the amount of grain by the amount of milk the cow produces, one pound of grain being fed for every three to four pounds of milk yielded. This amount of grain in addition to what roughage the cow will eat up clean twice daily will supply approximately the right amount of nutrients, for instance two cows weighing 1,000 pounds each, the one yielding 30 pounds of milk per day and the other 10 pounds of milk per day require respectively 13 therms of net energy and 9 therms net energy. If we feed each one of these cows 1 pound of grain for 3½ pounds of milk she produces, the first cow would receive 5.5 pounds grain and the second 2.75 pounds. If one pound of grain contains .75 therms energy there would be left in the first case about 8 therms of energy to come from the roughage and in the second case 7 therms. The average cow will eat enough roughage to supply 7 or 8 therms of net energy. Therefore, by feeding grain in proportion to milk yield each of those cows has received about the proper amount of food. I have known dairymen who fed all the cows in the herd the same amount of grain regardless of the amount of milk the various cows were producing. This is certainly a very wasteful method of feeding. Were these dairymen to take the same amount of grain they are now feeding their herds and re-distribute it among their cows in proportion to the amount of milk each cow is giving, the yield of milk would be decidedly increased without one cent of additional expense.

A still more accurate method of determining the amount of feed that each cow should receive would be to feed the cows in accordance with the established feeding standards. Scientists have devoted lifetimes of study to the question of how much food a cow needs for maintenance and how much she needs for the production of milk. Wolff, Lehmann, and Kellner of Germany; Atwater, Haeker and Armsby of America might be mentioned among the many who have devoted much study to this question. The result of this vast amount of investigation and experiment has been the formation of feeding standards setting forth the amount of protein, carbohydrates and fat or energy that the cow needs for maintenance and milk production. While these standards may not be absolutely exact, yet they tell the actual needs of the animal so closely that the man who feeds his cows in accordance with their provisions will almost invariably secure better results than the man who feeds simply by guess. Bulletin 114 of the Pennsylvania Station and Bulletiin 130 of the Minnesota Station outline Armsby's and Haecker's feeding standards respectively.

PROPER BALANCE BETWEEN PROTEIN AND ENERGY

From the foregoing discussion it is evident that a proper balance should be maintained between protein, or repair material, on the one hand and carbohydrates and fat, or energy value, on the other, if one is to secure the best results from the food supplied to the dairy cows. "A balanced ration is the feed or combination of feeds furnishing the several nutrients—crude protein, carbohydrates and fat—in such proportion and amount as will properly and without excess of any nutrient nourish any given animal for 24 hours." A balanced ration is not identical with an unlimited supply of food, since the ration is out of balance when it contains an excess of any nutrient as well as when it lacks in certain nutrients. For instance, a properly balanced ration for a cow producing 20 pounds of milk daily could never be secured from timothy hay, corn silage, corn meal, and oats or bran, no matter how liberally the cow was fed, for if she ate enough of the foregoing feeds to supply her protein requirements, the carbohydrates and fat would always be in excess and vice versa if only enough of the foregoing feeds were consumed to meet the carbohydrates and fat requirements, the protein supply would be far below the standard. The following rations will serve as examples:

POORLY BALANCED

Food Requirement (Armsby's Standard).	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds of 4% milk,	1.50	12.00	....
10 lbs. timothy hay supplies,	.21	3.35	$0.09
30 lbs. corn silage supplies,	.27	4.96	.06
4 lbs. corn meal supplies,	.27	3.52	.06
2.5 lbs. wheat bran supplies,	.25	1.20	.035
Total food supplied,	1.00	13.03	$0.245
Difference from requirements,	—.50	+1.03	

This particular cow weighing 1,000 pounds and yielding 20 pounds of 4% milk needs 1.50 pounds of digestible protein and 1,200 therms of net energy in order to maintain her body and furnish material for the production of twenty pounds of 4% milk.

Now let us feed this cow such a ration as many farmers are feeding their cows, i. e. 10 pounds of timothy hay, 30 pounds of corn silage, and for grain 4 pounds of corn meal and 2.5 pounds of wheat bran. We find upon adding up the amounts of nutrients supplied by this ration that we have given this cow only 1 pound of protein whereas she needs 1.50 pounds. On the other hand we have supplied her with 13.03 therms of net energy whereas she needs only 12 therms. In other words we have given her only two-thirds as much protein as she needs and have supplied an excess of 1.03

therms of energy. What is the result? This cow has an insufficient amount of protein with which to manufacture 20 pounds of milk and, therefore, declines in her milk yield. On the other hand she has an excess of carbohydrates and fat, or net energy, and therefore fattens up. Then the farmer accuses the cow falsely of being to blame for the poor results. He thinks she is getting enough feed for he is giving her one pound of grain for three pounds of milk she produces and she is getting fat but is declining in her milk yield. As a matter of fact it is not the cows fault at all that she is decreasing in milk yield, it is the fault of the ration which has not supplied the material out of which to make milk but has given her an excess of the material with which to fatten up her body.

The foregoing ration could readily be put in balance by the substitution of two pounds of cottonseed meal for three pounds of corn meal. We would then have the following computation:

WELL BALANCED RATION

Food Required.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 lbs. 4% milk,	1.50	12.00	....
10 pounds timothy hay supplies,	.21	3.35	$0.09
30 pounds corn silage supplies,	.27	4.96	.06
1 pound corn meal supplies,	.07	.88	.015
2.5 pounds wheat bran supplies,	.25	1.20	.036
2 pounds cottonseed meal supplies,	.70	1.68	.04
Total food supplied,	1.50	12.07	$0.24
Difference from standard,	.0	.07	

The substitution of two pounds of cottonseed meal for three pounds of corn meal has evidently so modified the ration that it meets the needs of the animal very closely. On this ration the cow could go ahead day in and day out and make 20 pounds of milk while with the first ration it would be impossible to maintain the yield. Furthermore, with the improved ration the total amount of grain fed per day and the cost of feed per day is less than with the unbalanced ration. The substitution of good clover hay for timothy hay in the poorly balanced ration would also do much toward putting it in proper balance. More milk for less money is certainly "a consummation devoutly to be wished" and might often be attained by dairymen through a modification of their present ration so that it would properly meet the needs of the animal.

PALATABILITY

The palatability of the ration is important in that well liked feeds stimulate digestion and induce the animal to consume heavy rations. Some feeds are more or less distasteful to cows. For example, malt sprouts, brewers' grains, distillers' grains, gluten feed, and cottonseed meal. These should be mixed with those which are more palatable such as corn, oats, and wheat bran. A cow can be taught to eat almost any normal feed by mixing a small amount with that to which she is accustomed, gradually increasing the amount of the new feed. It is usually better, however, to have at least a fair proportion of palatable grain feeds in the mixture.

The following examples of unpalatable and palatable rations are given for illustration:

UNPALATABLE RATION

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1000 pound cow, 20 pounds 4% milk,	1.50	12.00	....
10 pounds timothy hay,	.21	3.25	$0 09
10 pounds corn stover,	.15	2.65	.04
5 pounds wheat straw,	.02	.98	.02
2 pounds gluten feed,	.40	1.55	.085
2 pounds brewers' dried grains,	.38	1.20	.029
2 pounds malt sprouts,	.24	.92	.035
2 pounds corn and cob meal,	.09	1.44	.024
Total food supplied,	1.52	12.02	$0.273

While the foregoing ration supplies the needs of the animal so far as total food value is concerned, yet the ration is so unpalatable that the animal certainly would make but poor returns for the feed supplied. In fact it is doubtful whether a cow would eat such a grain mixture at all on account of its distastefulness. The situation would be similar to that of a man's having to live on "hard tack and salt pork." While he might be able to secure sufficient nourishment from such a diet, yet the lack of palatability would be such that he would eat as little as possible. We have already noted that with dairy cows a large consumption of feed is essential to a a large and economical production of milk. The cost of this ration, $.273 per day, is also high, since timothy hay is an expensive feed for dairy cows on account of its low food value and high market price.

PALATABLE RATION

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 lbs. 4% milk,	1.50	12.00	....
10 pounds clover hay supplies,	.54	3.47	$0.08
30 pounds corn silage supplies,	.27	4.96	.06
2 pounds corn meal supplies,	.14	1.78	.03
2 pounds wheat bran supplies,	.20	.96	.028
1 pound cottonseed meal,	.35	.84	.02
Total food supplied,	1.50	12.01	$0.218

This latter ration furnishes the food requirements in a palatable and appetizing form. Not only is the total food value of the ration equal to that of the unpalatable combination but on account of the superior palatability of the latter ration it would be conducive to better yields than would be the former. Furthermore, the cost of the palatable ration is only $.218 per day while the unpalatable ration costs $.273 per day. This saving is effected by the use of clover hay and silage, both economical roughages, instead of timothy hay and by cottonseed meal for inexpensive protein and corn meal for low priced energy.

SUCCULENCE

A cow will not do her best unless she has succulent feed such as corn silage, roots, moistened beet pulp or June pasture grass. One reason why a cow always does her best in June is because she is getting plenty of succulent feed. Pasture grass is most abundant at this time, and furthermore is well balanced in its ratio of protein to carbohydrates and fat. If a cow is not giving a large amount of milk she will get along very nicely with no other feed save plenty of pasture grass. A cow producing 25 pounds of milk per day, however, can scarcely secure enough food from pasture grass alone to continue at a high level of production, and ought to have some grain in addition to her pasture.

When the pasture begins to dry up in July and August, how is a man to keep the milk flow from declining? There are two or three ways in which this may be done: First, one can feed the cow more grain. That is an expensive method, however. Second, one can feed soiling crops such as green oats and peas, millet, barley and peas, or green clover. Any of those crops fed during the short pasture season will maintain the flow of milk. The objection of this system is that it calls for a considerable amount of labor at a busy season. Third, one can put up enough silage to have a supply for the season of short pasture. I believe that the summer silo, that is one which is comparatively narrow in diameter, and which holds silage enough for the year around is the best and cheapest solution of this problem. Even those who are raising soiling crops frequently find that it is an advantage to cut these crops when they are at their best and put them into the silo to be fed out as needed.

Roots are also an excellent succulent feed. Their chief value lies in their high palatability and succulence rather than in their food value. Mangels are the best root crop for the dairy farmer to raise. The Cornell Experiment Station found that 10 pounds of mangels would take the place of one pound of grain up to the extent of half the grain allowance without causing any diminution of the milk flow. This means that the dairymen with clover hay, corn silage and mangels at hand can get along with the minimum amount of grain and can largely escape that greatest drawback to dairying, the large bill for purchased feeds. Roots, however, are expensive as compared with silage. There is a lot of labor connected with raising them. At the Pennsylvania Station it was found that the cost of 100 pounds of dry matter in roots was five times as great as with corn silage. The man with a limited amount of land had better raise only corn silage. The man with more land can well afford to raise both silage and roots, in order to lessen the purchased feed bill. Apple pomace silage is another succulent feed that is worthy of consideration, since it is nearly equal to average corn silage in feeding value.

If no succulence of any kind is available with the roughage the grain mixture should contain some laxative feeds such as wheat bran or linseed meal in order to impart the desired laxative qualities to the ration. The following rations are given as examples of non-succulent and succulent rations:

RATION LACKS SUCCULENCE

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	....
10 pounds timothy hay supplies,	.21	3.35	$0.09
15 pounds corn stover supplies,	.27	3.98	.06
3 pounds corn and cob meal,	.13	2.16	.036
1 pound gluten feed,	.20	.79	.018
3 pounds cottonseed meal,	.70	1.68	.04
Total food supplied,	1.51	11.96	$0.244

The foregoing ration furnishes sufficient food for a thousand pound cow yielding 20 pounds of 4% milk but the ration lacks succulence. No silage or roots appear in the ration, neither is this lack of succulence in the roughage counterbalanced by laxatives in the grain mixture such as wheat bran or linseed meal.

RATION CONTAINS SUFFICIENT SUCCULENCE

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	....
10 pounds clover hay supplies,	.54	3.47	$0.08
50 pounds corn silage supplies,	.27	4.96	.06
2.5 pounds corn and cob meal,	.11	1.80	.03
1.2 pounds gluten feed,	.24	.95	.021
1 pound cottonseed meal,	.35	.84	.02
Total food supplied,	1.51	12.02	$0.211

The substitution of clover hay and corn silage in the place of timothy hay and corn stover supplies the needed succulence, and permits the use not only of less grain to complete the ration since more protein is supplied by the clover hay than by timothy, but also of a cheaper grain mixture since it is not necessary to use so much of the high protein feeds which command a high market price. The cost of the ration has been reduced from $.244 per day to $.211 per day.

HEALTHFULNESS

The feeds given the dairy cow should be such as will be conducive to the health of the animal and the quality of the product. An excess of either constipating or laxative feeds should be avoided. Timothy hay, corn stover and cottonseed meal are constipating. For this reason cottonseed meal should be fed with laxative concentrates or with succulent roughages. The milk of cows fed heavily on cottonseed meal yields hard, tallowy butterfat, light in color and poor in flavor. Excessive amount of cottonseed meal may be poisonous to the animal. If dairy cows are fed moderate allowances in a properly balanced ration no harmful results ensue. The quality of the product is not impared but may even be improved if the other feeds tend to produce a soft butter. A safe maximum allowance of cottonseed meal per cow per day is four pounds and the grain mixture not over one-third cottonseed meal.

Corn silage, roots, pasture grass, leguminous hay, wheat bran, and linseed meal are laxatives and should not form the entire ration. Linseed meal, while a perfectly safe feed, is so laxative in its nature that, as a general rule, is should not be fed in such amounts as to give more than a pound and a half to each cow daily. Opposite in effect to cottonseed meal, linseed meal tends to produce a soft butter fat, and is best adapted to rations lacking in succulent roughage. The following are given as examples of unhealthful and healthful rations:

UNHEALTHFUL RATION—TOO CONSTIPATING

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	....
10 pounds timothy hay supplies,	.21	3.25	$0.09
15 pounds corn stover,	.27	3.95	.06
3.5 pounds corn and cob meal,	.16	2.25	.012
2.5 pounds cottonseed meal,	.88	2.11	.05
Total food supplied,	1.52	11.69	$0.242

The foregoing ration would be detrimental to the health of the animal, even though it does supply enough nourishment. The feeds are all so constipating in this nature that the effects upon the alimentary tract would be injurious. The following ration is equally bad but in exactly the opposite direction, being too laxative.

UNHEALTHFUL RATION—TOO LAXATIVE

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
10 pounds clover hay supplies,	.54	3.47	$0.08
35 pounds corn silage supplies,	.31	5.78	.07
2.25 pounds wheat bran supplies,	.25	1.08	.022
1.00 pound ground oats supplies,	.08	.66	.015
1.25 pounds linseed meal supplies,	.34	.99	.036
Total food supplied,	1.50	11.98	$0.223

This ration is so largely made up of laxative feeds that it would most certainly be an ill-advised combination to feed milk cows, unless it were upon special occasions. A happy means betwixt extremes so far as laxative and constipating feeds are concerned is desirable.

HEALTHFUL RATION

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	....
10 pounds clover hay supplies,	.54	3.47	$0.08
20 pounds corn silage supplies,	.27	4.96	.06
2 pounds corn and cob meal,	.09	1.44	.024
1 pound ground oats,	.08	.66	.015
.8 pound gluten feed,	.16	.64	.014
1 pound cottonseed meal,	.35	.84	.02
Total food supplied,	1.49	12.01	$0.212

This ration in addition to being as well balanced as the immediately preceding ones is more economical than either of the foregoing and is so compounded that part of the nutrients come from laxative feeds and part from constipating feeds. There is no doubt that this ration would give better results for less money than would the rations listed as unhealthful.

BULK

For the best results the proportion of concentrates and roughages in the ration should be regulated according to the size of the cow and the milk yielded. The grain mixture should contain some light bulky feeds, such as wheat bran, distillers' dried grains in combination with heavier feeds, such as corn meal or cottonseed meal on account of the physical effects of such a mixture.

The amount of grain fed should be regulated by the amount of milk the cow produces. One pound of grain for each three or four pounds of milk is a good general rule. This amount of grain, in addition to what roughage the cow will eat up clean twice per day should insure economical feeding. When hay alone forms the roughage the cow will need about two pounds per day per hundred pounds of live weight. If hay and silage form the roughage, one pound of hay and three pounds of silage, per hundred pounds of live weight of animal is a fair allowance, the object being to provide sufficient bulk to satisfy the appetite and the feeding capacity of the animal. Whether one should feed a large or a small amount of roughage in proportion to the grain allowance depends largely upon the comparative price of grain and roughage. Should the roughage be scarce and high priced then it will be economical to use a small allowance of it and complete the ration with mill by-products. On the other hand if roughage is abundant and moderate in price it will be more economical to use a liberal allowance of home grown clover or alfalfa hay and corn silage in order that the cost of purchased feeds be kept as low as possible. The following are given as examples of rations, one of which is concentrated, the larger portion of the nutrients coming from grains; and the other bulky, the larger portion of the nutrients coming from the roughage:

CONCENTRATED RATION

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	…………
7 pounds clover hay supplies,	.38	2.43	$0.056
20 pounds corn silage supplies,	.18	3.31	.04
4.5 pounds corn meal supplies,	.30	4.00	.068
3.0 pounds wheat bran supplies,	.30	1.44	.042
1.0 pound cottonseed meal supplies,	.35	.84	.042
Total food supplied,	1.51	12.02	$0.248

The foregoing ration contains but a limited amount of roughage, the food requirements coming largely from grain. This ration would be desirable only when roughage was scarce or high in price and grain concentrates comparatively cheap.

BULKY RATION

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	…………
12 pounds clover hay supplies,	.65	4.17	$0.096
35 pounds corn silage supplies,	.31	5.79	.07
5 pounds corn meal supplies,	.03	.44	.008
1.6 pounds wheat bran supplies,	.16	.77	.023
1.0 pound cottonseed meal supplies,	.35	.84	.02
Total food supplied,	1.50	12.01	$0.216

The foregoing ration allows a liberal supply of roughage and but a small amount of grain. It is evident from a comparison of the cost of the concentrated ration with that of the bulky one, that it is usually an economical dairy practice to supply a liberal amount of farm grown roughages in order to minimize the amount of grain that must be purchased. The concentrated ration cost $.226 per day while the bulky ration costs but $.216 per day. Moreover a ready market is furnished in this way for large amounts of farm grown hay and silage.

VARIETY

The ration composed of a variety of feeds will usually give better results than when a smaller number are employed even though the latter does contain the necessary amount of nutrients. Two or more roughages, one leguminous and one succulent in character are desirable; while the grain mixture should contain at least three different concentrates. Especially in the case of high producing cows that are being forced for official tests is it desirable to have a variety in the ration, although this does not imply that there should be sudden changes in the ration from day to day. In fact sudden changes in the rations are to be avoided. The better plan is to adjust the supply of feed so that the ration can be made from two kinds of roughages and several different grains; then make no more changes during the feeding season than are necessary. The following rations are given to illustrate the point:

RATION LACKS VARIETY

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	....
21 pounds clover hay supplies,	1.14	7.30	$0.168
5.3 pounds corn supplies,	.36	4.71	.08
Total food supplied,	1.50	12.01	$0.248

The foregoing ration shows that so far as food requirements are concerned they may be met by a single roughage and a single grain. Owing to the lack of variety, however, the yield of milk from cows fed such a ration would probably be decidedly lower than from cows fed a greater variety of feeds. The ration is expensive and the cows would be more apt to tire of it than with one of greater variety, somewhat similarly as the human species of animal would tire of a constant ration of nothing but dry bread and salt pork.

RATION WITH A VARIETY OF FEEDS

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	....
10 pounds clover hay supplies,	.54	3.47	$0.08
30 pounds corn silage supplies,	.27	4.96	.08
1.5 pounds corn meal supplies,	.10	1.33	.023
1.5 pounds wheat bran supplies,	.15	.72	.021
.5 pound ground oats supplies,	.04	.33	.007
.8 pound gluten feed supplies,	.16	.63	.014
.7 pound cottonseed meal supplies,	.25	.59	.014
Total food supplied,	1.51	12.03	$0.239

This is a palatable, nutritious ration with sufficient variety to prevent any flagging in the appetite of the animal. The milk yield would be well sustained from day to day on a ration having the variety of appetizing feeds listed therein. At the same time the cost of the ration is only $.239 per day as compared with $.248 for the ration lacking variety.

COST

The cost of the ration is one of the most important factors for the farmer who must depend upon the returns from his dairy herd for his living. The market price of a grain feed gives very little indication of its economy. The true index is the relative cost at which it furnishes digestible protein and net energy. There are many feeds on the market selling for a low price which contain so little food value that they are in reality expensive when compared with standard feeds having a higher market price. In making up the grain mixture one should combine those feeds which furnish digestible protein at a low cost with those furnishing net energy at a low cost. The final results should be an economical ration which furnishes the proper amount of protein and energy and which at the same time is palatable, healthful, and is composed of a variety of feeds. The following table shows the composition, market price and the economy of various concentrates and roughages:

ECONOMY OF FEEDS

	Vegetable protein per cwt.	T. energy per cwt.	Market price per cwt.	Cost of 100 lbs. digestible protein.	Cost of 100 T. energy.
Barley,	8	81	$1 80	$22 50	$2 22
Brewers' dried grains,	19	60	1 45	7 64	2 42
Corn meal,	7	89	1 50	21 40	1 71
Cottonseed meal,	35	84	2 00	5 71	2 38
Distillers' dried grains (corn),	22	79	1 85	8 41	2 33
Gluten feed,	20	79	1 75	8 75	2 22
Hominy,	7	89	1 45	20 71	1 61
Linseed meal (new process),	27	79	2 10	7 77	2 78
Oats,	8	66	1 50	18 50	2 32
Wheat bran,	10	48	1 40	14 00	2 92
Clover hay,	5.4	35	80	14 80	2 29
Mixed hay,	3.7	34	85	23 00	2 50
Timothy hay,	2.0	33	90	45 00	2 73
Corn stover,	1.8	27	40	22 20	1 50
Corn silage,	.9	17	20	22 50	1 18

The digestible content of barley according to the table is low as is also that of corn meal, hominy and oats. In order to be satisfactory in a dairy ration these low protein feeds ought to be combined with those which are higher in protein, i. e. brewers' dried grains, cottonseed meal, distillers' dried grains from corn, gluten feed and linseed meal. Clover hay contains 2.7 times as much protein as timothy hay, a fact which explains why clover is so much better adapted to dairy cattle feeding than is timothy. Corn stover is almost equal to timothy hay in feeding value. The farmer who allows corn stover to go to waste while feeding timothy makes a bad mistake. If he has more roughage than is necessary to carry his herd through the winter he had better sell timothy hay, which commands a high market price owing to the demand for it for feeding horses, and feed the corn stover to his cows, thereby securing almost equal returns at much less cost.

The energy or fuel value of brewers' dried grains, oats and bran is low. These evidently are not fattening feeds as their heat value is low. On the other hand barley, corn, cottonseed meal and hominy are high in energy value and are heating in their nature. Clover hay is higher in fuel value than timothy hay and corn stover nearly as high as the latter. Corn silage has about one-half the food value of timothy hay or corn stover.

The market price of feeds given is that of the Pennsylvania State College. It is likely that prices at other locations would vary somewhat, but probably the whole range of prices would be slightly higher or lower so that the comparison of economy between different feeds will be approximately correct for other locations.

The cost of 100 pounds of protein is high with barley, corn, hominy, oats and bran, while it is low with dried brewers' grains, cottonseed meal, distillers' dried grains from corn, gluten feed and linseed meal. Cottonseed meal at $2.00 per cwt. is an especially economical protein feed since it furnishes 100 pounds of digestible protein for $5.71 the lowest cost for protein of any of the feeds mentioned. Clover hay furnishes protein at a lower cost than any other roughage mentioned, $14.80, while timothy hay charges the enormous price of $45.00 for 100 pounds of digestible protein. This high cost of protein in timothy hay is caused by the combination of high market price and low food value. The writer conversed recently with a dairyman who sold his timothy hay last fall and purchased alfalfa hay in its place at only a few cents higher cost per ton. The saving thus effected, owing to the greater feeding value of the alfalfa hay, amounted to a considerable sum of money by the end of the feeding season.

The cost of 100 therms of energy is found to be lowest with such concentrates as corn meal and hominy. The roughages that furnish energy at low cost are corn stover and corn silage which is the most economical energy feed at $4.00 per ton to be had furnishing energy at the very low cost of only $1.18 per hundred therms of energy.

An economical ration evidently would be secured by selecting such concentrates as furnish protein at low cost e. g. cottonseed meal, gluten feed, and distillers' dried grains and combining them with economical energy feeds such as corn meal and hominy. Then as a roughage we would combine clover hay, the most economical protein roughage with corn silage, the most economical energy roughage. The following examples of costly and economical rations are given for illustration:

EXPENSIVE RATION

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	....
20 pounds timothy hay supplies,	.41	6.71	$0.18
1 pound corn meal supplies,	.07	.89	.015
2 pounds ground oats supplies,	.17	1.33	.03
3 pounds wheat bran supplies,	.30	1.44	.042
2 pounds linseed meal supplies,	.55	1.58	.042
Total food supplied,	1.50	11.95	$0.309

The feeding of such a ration as the foregoing is an expensive proposition. Timothy hay is an expensive roughage being low in food value and high in market price. Not only is timothy hay expensive in itself but owing to its low food value it requires a large amount of grain to complete the food requirements of the animal. Furthermore, the grain mixture is an expensive one, since a considerable amount of high protein concentrates are necessary. Protein as has already been stated is a costly nutrient to purchase. The total cost of the ration is nearly 31c. per day. The yield of milk would be sufficient to make about one pound of butter. This would sell for but little more than 31c. as the average for the year. It is, therefore, evident that with timothy hay as the roughage there is a very close margin between the cost of production and the selling price of the product.

ECONOMICAL RATION

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	....
10 pounds clover hay supplies,	.54	3.47	$0.08
20 pounds corn silage supplies,	.27	4.96	.06
2.5 pounds corn and cob meal,	.11	1.80	.03
.8 pound gluten feed,	.16	.63	.014
.8 pound brewers' dried grains,	.15	.48	.012
.8 pound cottonseed meal,	.28	.67	.016
Total food supplied,	1.51	12.01	$0.212

In place of timothy hay this ration uses clover hay and corn silage which form a palatable, nutritious and succulent roughage, high in food value and low in cost. This roughage combination requires but a comparatively small amount of an inexpensive grain mixture to complete the ration. With timothy hay as a roughage 8 pounds of an expensive grain mixture were needed to complete the food requirements; with clover hay and corn silage as roughage less than 5 pounds of an inexpensive grain mixture are needed.

The clover hay and silage ought to be grown upon the dairy farm, and on many farms corn can be grown to furnish the corn and cob meal in which case over half the grain mixture would be home grown, leaving but a small amount of concentrates to be purchased. The cost of the expensive ration was 31c. per day while that of the economical ration is 21c. per day, a saving of 10c. per day on the feed bill for each and every cow in the herd, producing 20 pounds of 4% milk per day. Were the milk yield greater than 20 pounds daily, the saving would be correspondingly increased. Through the use of leguminous hay and cheap succulence such as corn silage, together with grain from corn it is possible to go far toward supplying the dairy herd with a healthful, well balanced and economical ration.

ECONOMIC FACTORS IN BEEF PRODUCTION

By PROF. W. H. TOMHAVE, *State College, Pa.*

This subject is one that is broad in scope and we could spend a good deal of time in discussing the various phases of it; but I want to call your attention to one or two important factors that I have in mind, possibly dwelling a few minutes upon some of the changes that have taken place in the beef industry during the past 25 years.

Beef production is an old established practice in the State of Pennsylvania, as many of you know. It has been a part of the business of farming in Pennsylvania, and I am glad to say that those who have practiced it I believe have gotten some most excellent results in spite of the fact that frequently they have encountered difficultie and have had competition that has been keen, especially from other sections of the country. Prior to 1908, very little consideration was given to the cost of production. Up to that time practically all the experiments that were being conducted were conducted primarily to determine the kind of ration that would give us gains per head daily for the ration, that would give us the greatest number of pounds of gain regardless of cost, but with the increase in the price of feed and with the increase in the price of lamb and the demand for grains for human feed, it became necessary to give the matter of the cost of production some consideration, and since that time a great deal of valuable work has been done at a number of experiment stations as well as by practical feeders, to work out some of the phases of the cost of production, and I am glad to say that we are getting some light on the subject, and it is remarkable the changes that the practice of feeding is undergoing. The practice has been entirely revolutionized, entirely changed in the last five or ten years, as I hope to show you in a few minutes.

Another thing that we should keep in mind is this, that wherever beef production has been carried on, we find our best farms. You have sections of this State, go where you will, in different parts of the United States where livestock has been a part of the business of farming, and there you find prosperous homes, land high in value, and the farmers have money in the banks. Not that I maintain that all the money is made out of livestock, but simply because the farmers had the livestock, possibly as a side issue, it was possible for them to keep up the fertility of the land. Their income was not from one source alone; they were able to increase the value of the land, increase the fertility, build it up, make it more valuable from year to year rather than have it depleted in soil fertility, depleted in humus and reach the stage where it ceased to produce in spite of all the commercial fertilizers they care to purchase. I believe every man here will bear me out in that statement.

Now we have in this State, to my mind, wonderful opportunities for beef production. We have natural resources that are especially well adapted to beef production. Pennsylvania is naturally a grazing State, a state well adapted to the production of roughage, such as hay, corn silage and feeds of that character. Our problem is not to find a market for grain, we have a market for all the grains we produce; besides that we ship in thousands and thousands of bushels of grain of one kind and another to feed our livestock, both on farms and in the city, but what we want is some means of disposing of the roughage produced, keep it on the farm, marketing it through livestock and putting it back on the land. Furthermore we have hundreds and thousands of acres in this State being cultivated today that ought to be utilized in livestock production, that is to say, put upon those hillsides in these rough areas that are difficult to till, animals that would graze over those areas and give us the returns from that land in that way; and the animals especially adapted for work of that kind are beef cattle and sheep.

The Pennsylvania breeder or the Pennsylvania farmer has this problem to meet; in the first place, he must have his feeding cattle. In the past we have been in the habit of going to Western markets, Virginia and other sections where feeds have been produced, to get our supplies; but what are the conditions confronting us today? The price of feeders is going up year after year, and the margin between the price of feeders and the price of cattle is getting so narrow that it is difficult to continue in the feeding business at the present increase in the price of feeding cattle. In 1912, we were able to buy our feeding cattle at approximately between five and six cents a pound in West Virginia, southwest Pennsylvania and on the Pittsburgh market. In 1913-14 we paid about a dollar more. In 1915 we paid about fifty cents more, and yet the price we have received from finished cattle this spring has not increased in proportion to the price we paid for feeding cattle. Why? Simply because the number of feeding cattle that are being produced in the country today to be sold as feeders to the men that feed during the winter, are becoming scarcer every year. That means that the Pennsylvania farmer must solve his problem by the production of more feeding cattle in this State. I believe there are large areas where that can be done.

The first thing we must solve then is the cost of maintaining the beef-breeding herd. Up to a few years ago, it was generally considered that it was unprofitable and impracticable under the average farming conditions to maintain a beef cow for the calf she produced. I am happy to say that experiment stations and practical men are now getting results from their work showing that it is possible to maintain a beef-breeding cow for the calf she produces and may make a profitable source of income. There are certain factors however that we must keep in mind in beef production. In the first place, get the proper kind of an animal, the proper type of animal, one that will utilize its foods to the best advantage. You cannot take any old scrub and expect it to give you good returns in the feed line. The dairyman tells you that is true and the beef man will tell you that is true, because there is too much waste and the animal does not utilize the feed to advantage. So first of all, you must have a proper kind of animal. Then in the second place you must keep down the cost of feeding. The minute you begin to feed expensive grains, you are going to increase the cost of maintenance. In the third place, you must keep down the cost of shelter or the investment, the capital invested in your equipment. In the fourth place, keep down the cost of labor. That is a problem we must meet. We must meet the competition from the industrial centers, from the manufacturers, and must devise some scheme whereby the labor required can be reduced to a minimum, and furthermore the operations must be so arranged that the labor can be distributed throughout the entire year and that most of the labor is required during the winter months.

I am going to just call your attention to a few facts brought out in these charts. Five years ago this last fall we started an experiment,—I have discussed part of this experiment before some of you men before,—to determine the cost of maintaining a herd of beef-breeding cows, taking pure bred animals purchased in different sections of the State, all pure bred, and building up a herd by the use of good, pure bred sires. We were rather unfortunate in the beginning to get cows the breeding record of which we did not know. In other words, we got some cows that were barren, some that were not regular feeders, and the result was that we had to keep on culling until today we have a herd that is giving us 100 per cent. calves; every cow in the herd today has produced a calf within the last year. Then, at the time we started with 20 pure bred cows, 10 Aberdeens and 10 Shorthorns, simply taking those two breeds because we found the greatest number in the State of Pennsylvania. Then, in selecting the feed, we found that corn silage was being produced in every section of the State and more ought to be produced, so we used that as far as the basis was concerned, and supplemented that with cotton seed meal, which is high in protein.

I am going to look over this very briefly, simply calling attention to a few of the figures giving the results of the first three winters' work. I did not have time to compile the data for the last two winters, but the results are more favorable than the first three. You notice that the cows there received all of the corn silage they would consume and consumed an average of almost 59 pounds in lot 1 and 58 in lot 2. They were limited to 1 pound of cottonseed meal per head daily. These were mature cows. Then the average cost of feed, corn silage at $3.50 a pound and cottonseed meal at $30.00 a ton. Comparatively a small amount was fed each day; even though we increased that to $40.00 a ton, it would mean only an increase of one-half a cent a day, or approximately 75 cents for the winter. Then we kept a record of bedding required for these cows, charging straw at $8.00, which made for each cow $4.35 for bedding; labor at 15 cents per hour, $2.33 for labor to take care of one cow. Value of manure produced, $7.32. That is a fair average of what you can do. The one thing you must keep in mind is to have a good working unit, and the same thing must be true in business of any kind. This gives you a summary for the three summers; length of the summer period, 210 days; and bear in mind that where you have grazing lands, you can keep down the cost of production if you can utilize grass for a long period, for the longer the period the more favorable your conditions. Interest on pasture land, land for cow, $5.60; for calf, 33 cents. Labor cost, 15 cents per hour, is simply a matter of looking at the cows occasionally, seeing that everything is in good condition and salting the cows, 80 cents per head.

Now, in that connection remember that this pasture land, properly handled, will increase in value from year to year where cattle are grazing over the land. This same area three years ago was a poor, run down pasture; nothing has benefited it except the cattle grazing over it, and it is almost 100 per cent. better today than three years ago. Part of it was a cornfield five years ago and never had a bit of grass upon it. Bluegrass comes in naturally on limestone soil. This gives a summary for the three years, $17.61 in lot 1 and $17.50 in lot 2; $5.40 interest on the value of the cow. That is something you should charge. These cows were purchased at $75-$100 per head. Service of sire charged at the rate of $2.00 per year. Interest on the value of equipment and depreciation, $1.50 per cow, making a total of $33.54 in one case and $34.11 in the other case. In return for that you must have a calf to pay that bill. Now this figure simply shows the first three years' work. You notice that in the case of the Shorthorns, less than 50 per cent. had calves; the last two years we have had 90 per cent. and 100 per cent. of calves. The consequence is that our results are far more favorable at the present time than during the first three years. This gives the weight of the calf at time of birth and the average weight 12 months later, 671 pounds Shorthorn and 588 in the Aberdeen lot.

Here is a thing we must reckon with. This was the value of the calf at 12 months of age; 100 per cent. of calves, charging everything, pasture after four months and the feed they consumed, would cost $38.26 (reads the table). In other words, you must have at least 70 per cent. of calves in your herd in order to break even on this proposition at the price that prevailed at that time, the calves being valued at $8.00 per hundred when they were disposed of, and when you get down below that, you will be working on a losing proposition. So, in figuring the cost of maintaining a beef-breeding herd, a thing you want to keep in mind is regular breeders, cows of beef type that are good milkers. I would pay more attention to getting a cow that is going to give me a good supply of milk, and use a good, pure bred bull of the beef type, rather than take a cow of the extreme beef type that does not give enough milk to maintain a calf. We have a cow in our herd that none of you would pick, possibly, as the ideal beef type, a pure bred Shorthorn cow giving lots of milk, bred to a good beef-bred Shorthorn bull, and she has the best calf ever dropped on the place, because she has the food necessary to grow a good calf; so do not overlook the element of milk in a beef animal. The old saying that a beef cow does not have to produce milk is all wrong; she has got to produce sufficient milk to grow that calf up and grow him in good shape or she is better off in the hands of the butcher than in your hands, and very often you can use a cow that is not of as pronounced beef type as you would like, and a good beef bull, and you will get a calf that, as a commercial proposition, is going to grow into weight quickly and will make you more money than a cow that is not a good milker and is of the extreme beef type. So get a good milk cow and your bull as near the beef type as you can possibly get hold of. If you can get the milking qualities combined with that beef type, that is what you want.

I just want to call your attention to another chart; this simply gives the results of fattening the calves of that herd the first year (reads the table).

A Member: What was the age of those calves?

PROF. TOMHAVE: Running around twenty months when they were sold. This year we just disposed of our calves out of this lot from this same breeding, and the calves sold right on the place at $9.50 a hundred, right in the barnyard, fed and watered at night and weighed at seven the next morning; we sold them at 9½ cents, averaging a little over $90.00 per head, when they were 18 months of age, nursed the calves until they were 8 months of age, then they went on pasture the balance of the summer, and last fall we put them in the feeding lot, fed them 160 days, and they received corn silage, corn meal and cottonseed meal, and returned a very substantial profit. Now I want to just call your attention to a few rations in steer feeding.

The chart I have here covers our last year's work. That is one of the problems we must meet, namely, the rations to feed our cattle in the feed lot. The steers were divided into three different lots, or five different lots, I should say. Our experiments up to the last few years indicated that whenever we fed a large amount of roughage, made up largely of corn silage during the early part of the feeding period, supplemented with grain the latter part of the feeding period, and cottonseed meal throughout the entire feeding period, that gave us the greatest returns; so here we have what we commonly call the Pennsylvania ration, one that does not include corn silage. That does not apply to everybody, because a great many farmers are feeding corn silage, but it is the ration we fed a great many years. (Reads from the chart). This is the average amount of feed consumed during the entire feeding period. This lot over here gives the average weight, showing that they weighed approximately 900 pounds at the beginning of the experiment. The valuation was as follows: (Reads table showing consumption of feed by each lot and table valuation). You will notice that immediately after grain was added to the ration, the amount of corn silage consumed dropped. The lot of cattle receiving corn silage and cottonseed meal made heavier daily gains than any other cattle in there. (Reads table showing cost of feed for pork). This shows that wherever a large amount of silage is fed and is the principal feed, the animal utilizes it so that there is nothing thrown off that can be utilized by hogs. This shows that we have got to change our system of feeding.

I am personally convinced that the feeding of corn silage, supplemented by cottonseed meal is the system we have got to follow if we are going to make money. The complaint used to be that the packers objected to silage fed cattle. These cattle were valued by a commission man without knowing how they were fed, and he valued this lot here within 5 cents of the very best lot of cattle we had, and the packers bought them and regarded this lot as being worth within 5 cents of this lot here. These cattle, after they were hung up in the coolers, showed that this lot of cattle here was as firm, as white, as well finished, as any lot of cattle there. As a matter of fact, a beef man told me that he regarded this lot of cattle equal to any lot put in there, and yet they never received a mouthful of grain except the corn silage and cottonseed meal.

A Member: How much cottonseed meal was fed with the corn silage?

PROF. TOMHAVE: We plan to feed at the rate of 2½ pounds per thousand pounds of live weight for the first 200 days, and then increase it to 3½ pounds per thousand pounds of live weight during the last forty days, because the increase of an extra pound seems to stimulate it and the animals will make better use of the silage they receive. (Reads table showing prices of feed). The only change you might want to make is in the price of cottonseed meal.

Our cottonsed meal was purchased last fall at $3.50 a ton and we figured that it was only fair to use that figure in charging the prices for the feed, etc.

A Member: The price of silage, isn't that a little low?

PROF. TOMHAVE: I believe it is. I believe we ought to increase the charge for silage here, and yet a good many people feel that $3.50 is a very good price for silage.

A Member: I think it is too low.

PROF. TOMHAVE: It may be too low, but even increasing the price of silage to $4.00 a ton, our results would be extremely favorable, so far as the silage is concerned. There is no question about it; I believe that every man that is going to feed cattle in the State of Pennsylvania or any other, has got to put up a silo. He cannot afford to feed cattle without a corn silage, because his cattle will not make the gain without the succulent feed, the use of corn silage and cottonseed meal will stimulate digestion and give him a greater return than where the silage is lacking.

A Member: Would not the addition of some hay or corn stover to cottonseed silage improve the cattle?

PROF. TOMHAVE: I think so, I believe that if we had a little corn stover or straw, wheat straw or any other dry feed we care to put in there, it would have improved the condition of the cattle to a slight extent, giving them all the silage they could consume. The experiments in previous years show the use of a small amount of dry feed added to the rations is beneficial, that is, the cattle seem to relish or crave a small amount of dry feed of one kind or another.

The CHAIRMAN: One minute before we adjourn. I see a gentleman standing back here and if he don't get a chance to say something, it will be bad for us on the trip. I want to introduce Bob Seeds for just two minutes, only two minutes. (Applause).

MR. SEEDS: Mr. Chairman, Ladies and Gentlemen: It didn't matter whether the Chairman called on me or not; I intended to talk anyhow. I am like the man in Pittsburgh who tumbled from the top of a tall building and fell all the way down and they gathered him up at the bottom very much bruised and dilapidated, and he had sprained his ankle and they were trying to fix him up and was sympathizing with him, when he said that it didn't make any difference, that he intended to come down anyhow. (Laughter). I know this is no time to make a speech. You all want to adjourn, but if you can give me a future date, I would like to take this platform and talk just for a short time, not on Community Breeding, but on Community Building.

I never knew such a time in the United States when everybody, from one end of the United States to the other, wanted to talk Community Building. They are at it everywhere and I have become very much interested in it, and I tried, in my own community, to carry out everything I have said along that line. I claim that it is just as much of an impossibility for a man to raise a razorback hog and wear a white collar as it is for a paraffine dog to catch an asbestos cat going through hell. You have got to have things correspond. I heard of a man raising razorback hogs down South—did you ever see a razorback hog? If you have, you know you can't see him when he is going this way, he has got to go that way when you want to see him. Bill Nye and Col. Smith were on the platform at the same time down South and one day they were going through the woods when along came a razorback hog and ran across the road, and after a while another ran across, and Bill Nye said to Col. Smith, "There goes the other half of that hog." (Laughter). Now that man that raises that razorback hog wears a slouch hat, he wears one suspender—and I know what I am talking about. I heard of a man down South who was raising razorback hogs and he sold them; he didn't come to Pennsylvania to buy registered stock, but he went to Ohio and bought registered hogs; he took them down South and every one had a peep; his neighbors came over to see those hogs; they leaned up against the fence and chewed tobacco and talked about them until they got that man that owned the hogs going, and it wasn't long until he pushed the side of his hat up, bought another suspender and got a little taller than his neighbors, and he went into town and got his hair cut, got shaved, took a bath, put on a white collar and when he came home his own dog bit him. (Laughter and applause).

Now that is what I call, not community breeding but community building; that's the way I look at it, and if you can give me tomorrow or some future time ten minutes—not now, because it is time to adjourn, but if you can give me ten minutes, I would like to talk to you and tell you how I look at Community Building and what I have been doing to back up everything I say. I like a man who does what he talks about, that is the kind of a man I like, and if you can give me a future date or a future hour during this convention, I would like to have ten minutes and I will ask you fellows to give me a future date; like the lady in Ohio, who was going through western Ohio, lecturing out there, and one night she wanted to prove to her audience how suddenly changes could take place, and to prove it, she said to the audience: "Why, to-night I may be in my husband's arms and to-morrow night, I may be in Abraham's arms." A fellow in the back part of the hall cried out, "Have you got a date for next Tuesday night?" (Laughter).

VALUE OF FREE RANGE FOR POULTRY

By E. L. PHILLIPS, *New Bethlehem, Pa., R. F. D. No. 2.*

Mr. Chairman, Ladies and Gentlemen: I had the pleasure of spending eight days in Berks county last spring, and was very much delighted with the meetings, and I must say that I am glad to come back to the county. I was so much impressed after having spent five days in Berks county that I could not help express myself to the people at that time, and I did say to the farmers and business men that I had found, in my opinion, some of the most wide-awake energetic farmers and business men in Berks county that I had ever found in any county in the State of Pennsylvania. I think that I can give you evidence why I would make such a statement.

This afternoon I was taken out to the Fair Grounds, which has been organized I believe within the last ninety-six days, and within the ninety-six days these farmers and business men in Berks county have spent $94,000.00 in improvements and building, and I believe that it is the finest county fair in Pennsylvania; so they surely are wide-awake here, there is no question about it. And when I was asked sometime ago by the Department of Agriculture to speak at this convention, I thought I would enjoy speaking of some of the things that I felt were the most needful along our particular line, poultry, and that was the marketing of the poultry products.

Oh, I see room for such a wonderful improvement along this line, and it was thought that I would demonstrate that work, but I found after experimenting some along this line, being held up until this evening, leaving my home early Monday morning, that it would be absolutely impossible for me to demonstrate, so we have switched around a little bit and decided that we will illustrate the value of free range and the marketing of poultry products by illustration.

Now we have here on the screen, ladies and gentlemen, a picture that is not very attractive; indeed, it is a poultry house, one in my own county. This picture, and one other that will follow, are two that are not from our own plant, and the rest that we will have on the screen are from our own, because I have in mind to give you a practical talk, and while doing so, in talking of the things that we are dealing with over there at our plant, day in and day out, I think that I can do much better work.

Here is a poultry house, I say, in Clarion county, and it is one of the miserable failures of many in the State of Pennsylvania. It has an abundance of cracks and knot holes and a miserable roof; why, its an awful building, in my opinion, to attempt to keep fowls in. You see everything, almost everything except the floor of that poultry house. There was no lining in it, nothing other than what you see there, and for a floor in that building was a mud hole. After we have spent several thousand dollars in our attempt in raising poultry at Valley Farms, the gentleman who owned that poultry house came to me and said, "I have always understood and thought that you were a keen, wide-awake business man; but you have made one attempt that there will be no returns from, because I have tried this poultry business for a number of years and there is absolutely and positively no money in it."

Now, ladies and gentlemen, I will drop the poultry house for the present and we will refer to it just a little later on. Here we have some of the colony houses which we use at Valley Farms, and they have given us very excellent results. I have recommended, in speaking to the farmers throughout the State of Pennsylvania, that these types of houses would be, in my opinion, very profitable for them to use, and many of them have accepted my advice and are using houses similar to these. There are great advantages to those who are keeping just a few fowls and get out on the range, the fowls get out where they have clean soil and all that kind of thing, and I would not build those buildings larger than twelve feet or twelve feet six inches in length and nine feet in width, not more than five feet high in the rear and seven feet to seven and a half high in the front. If you build them larger than that you will have trouble, possibly in hauling them from place to place, and that is the idea and the advantage of the colony houses. This picture is rather dim; it just happened to be in the bunch of slides that I have with me and I thought it might be interesting to those of you who are interested in commercial poultry work. This building is one of our winter laying houses; it is one hundred and sixty feet long. We have these buildings ranging from one hundred to one hundred sixty feet long, sixteen feet wide, five feet high at the rear and eight at the comb, and the comb is nearer the front than the rear and is six and a half feet high in front. We will see more of this building later, as we go along.

Now, friends, you wonder why that picture might appear on the screen there, but there are several lessons in it. One lesson is—that is the daughter of the gentleman who owned that miserable old poultry house, and that little girl at the age you see her there in the photograph, said to her father: "Father, I would have you go and consult some one who is making a success of poultry and I will guarantee you, if you will give me equipment sufficient to handle those fowls, that I will bring a return from them." Now I have had acquaintance with this little girl as you see her there on the ground. She is now a young lady, grown up, and she has had a love for the poultry business ever since she was quite a small girl, and I want to say to you, ladies and gentlemen, that I have found, for a positive fact, that is one of the very essential things if you are going to farm poultry. Do not farm poultry because of fadism or anything of that kind, but test yourself first of all and find out whether or not you are adapted for the work and whether you really have a love for the work, and then you will succeed. If you are simply going into the poultry business because some one has told you some fabulous story relative to the earning power of this work, you may make the mistake that many people have made in the past. This little girl is in love with the work and I found her just as you see her there in the photograph, and I said to her: "I would just like to have that picture because I have need of it." There you see her; she is visiting with her fowls, collecting the eggs. She is working with those fowls all the while and she really and truly did show her father that there was quite an earning power from the poultry. It is one of the most profitable of all their undertakings on their farm at this present day, and she is controlling and she has the control of a very nice poultry plant consisting of about five hundred fowls.

Now, friends, we will study the chick for a little while. You know if we are going to make money from poultry, we will have to go in at the very beginning and we will have to surround these fowls with all the things that are conducive to their comfort and health, and if we do not, we are not going to succeed as we would. So now we have here on these platforms, while it is not very plain apparently, I don't know why, those fowls are two weeks of age and they are out there on those platforms and those platforms are on the easterly side of those buildings. I got a thought there by observing very closely some years ago. I noted that those little fellows simply had a great delight in getting out in the morning sun; they enjoyed it wonderfully, so we provide those platforms and those little fellows are out there on the easterly side of the building. They have access to those platforms as the sun is coming up. Then, on these platforms we provide nice, clean, coarse sand. Oh what a wallow and play they have there, and they seem to enjoy it most wonderfully. That does not seem very much, yet I have found in working this out in a practical way at our plant, that it is very helpful indeed and prepares or helps prepare these little fowls for the free range they will have access to later on in a very short time after that is seen. Another thought relative to that is this; they have the play in the sand, they wallow in the sand and pick a grain of sand possibly, and after this play is over, then the sand and the accumulation from those fowls is all cleaned up and taken away.

Friends, I want to say that we must pay very close attention to the sanitary conditions in and around the outside of these poultry buildings, and it is wonderfully helpful, indeed, and if it is neglected, there is liable to be very serious loss because of the conditions not being as sanitary as they should be. At the age of four weeks, as I remember, when this picture was taken we have another lesson, studying these little coops. You note there the window and the awning board are up high and the reason why we have that picture is to emphasize the fact that we must not only pay attention to the outside of the buildings, as we noted in the last scene, but also the interior of the buildings, and, I might say, that many of the brooder houses in the State of Pennsylvania do not have the needed sunlight that should be in those buildings. At our plant, and we are keeping and raising thousands of fowls, we aim to have the sunlight getting into these buildings as much as we possibly can, and you will see at Valley Farms that nearly all the time during the day, when the sun is shining especially, you will note that we arrange to receive the sunshine and then we have the interior of those brooder houses flooded with good pure air, which is very essential and very conducive to the health of the fowl.

A Member: What is the elevation of that house that you have shown?

MR. PHILLIPS: The elevation of that house, the height in front is seven feet, I believe, if I remember right. Does that answer your question?

A Member: Yes, sir. There is no heat in that house, is there?

MR. PHILLIPS: No, sir, no heat in that house. They have been taken away from artificial heat. This picture here emphasizes something that, to the commercial people, will be of interest. In that building there you notice it is quite a large building and there are quite a number of fowls in there, and I remember when the picture was taken those fowls were eight weeks of age and we did brood in that building at the time that picture was taken, from chickhood up, between five and six thousand chicks; but I want to say to you, ladies and gentlemen, that that was quite an undertaking and I would not advise it in the hands of a novice by any means, or any one who is attempting to handle poultry in a commercial way, unless they are very well prepared for the work indeed; but my son, H. H. Phillips, took charge there, and, as you see, those fowls are eight weeks of age and but a very few of those little male birds, possibly half a dozen or thereabouts, but when the picture was taken there were around about thirty-five hundred to thirty-six hundred pullets; but, as I say, this is quite an undertaking, but it shows you what can be done if we are following our work carefully, and it is handled with all the care needed, care that must be bestowed upon this work. We succeeded very well in that, and it simply emphasizes that fact, that those things can be accomplished if the needed care is given. Now I said we would try and speak of some of the things that are very helpful relative to the free range for fowls.

Here we have a picture that you might think at first sight is a rather peculiar scene, and I have been asked frequently if those poultry houses there were placed in a field of stumps. No, not by any means. Those poultry houses are placed in a field that had a very nice start, vigorous growing sod clover and timothy, and here you will note what has been going on. We just sweep over a field, go right back over a field, keep moving back. Here we have been down in this region and see what has happened. This heavy sod has been trimmed down to the roots, so we just keep moving back as you note there. Now study carefully what is occurring and bringing this work out here in a practical way. Here we are going in another direction. Note here the same thing has been happening. As I said, we are sweeping in another direction and we go right over those fields with thousands of fowls, and, ladies and gentlemen, you would be astonished, those of you who have never had the opportunity to note the amount of such an improvement, such as nice tender grass and things of that kind, that they will consume if they have free access to it, and oh, how conducive it is to the health of the fowl.

Here is the thought in that picture that to my mind is very valuable; you know we poultry people have been studying for quite a long while and we have been writing and we have been lecturing on the construction of poultry houses to house the fowls in the winter time. Oh we have spent so much thought and we have spent so much work along that line, and here in the background, if you will note—I should have called your attention to that fact before—but in each and every one of these views, you will note that we have an abundance of natural shade. Listen, friends, I have found that fowls will suffer as much or even more from the intense heat in the summer time as they will from the severe cold in the winter time, and I would admonish you at all times to furnish your fowls an abundance of natural shade, and I think as we go along with this illustrated work, that you will find at your farm, it is to your advantage, if you possibly can, to arrange to supply that shade.

Here we have two thousand pullets; the youngest in that picture is four months of age and the oldest is six months of age, and we are certainly trying to keep one thing at our plant that is very helpful, and if we do not have it, we surely will fail, and that is an abundance of constitutional vigor, and surrounding these fowls with what I have already called your attention to is very helpful in getting that vigor, and those fowls there, as you see them, surely show signs of vigor, but that is not the purpose for which I have that picture before you. You will notice the sunlight coming in over there shining in way back underneath the dropping boards. I said you would see more of these large buildings when we called your attention to the one in the second picture. This is the sunlight getting into the building. Here is how we get it in. One-fourth of the entire front of our buildings is open, or the upper half, as you see it in that picture there, and we have a muslin curtain down there in order that you may see the muslin curtain, but that muslin curtain has not given us the satisfaction it should have done, and in the last twelve months we have tried out an experiment so that we can now come to you and give you information along that line that you can bank on and that will appear in a later picture.

Now, friends, here is a scene that is something that we need to study; if we study the habits of these fowls, if we surround them with all the things that are conducive to health and vigor, etc., and then study carefully, we will learn many, many lessons by observation, and that is one of the greatest features in this wealth. You will note that those fowls are coming down those running boards pell mell; they are surely after something, there is something that is attracting their attention. Now the first thing that they have access to there is something that I want to make a plea for this evening for the fowls of Pennsylvania, and the first thing that those fowls have access to there is good, pure water. Good pure water is delivered to each and every one of those poultry plants at our farm, and I want to say to you, ladies and gentlemen, that I make a plea here this evening for good pure water just such as we are furnishing there, the very best we can get, perfectly safe for any home; that is the very kind of water that I would have you furnish to your fowls, and the reason why I put it so strong is because so many of the fowls of Pennsylvania have access to stagnant, filthy pools where there is nothing more or less than disease and death. They have access sometimes to the juices from the barnyard, from the pig pen, and things that are even worse yet that I will refrain from mentioning this evening, and I want to say to you friends, that my plea is that the fowls be kept away from those things, because sooner or later we will go to the market with the product of that fowl, and if those fowls are going to have access to these filthy things, are we going to the market with that which we should take to feed the consuming world? Brother farmers, that is your job and my job, to feed the consuming world. I want to say to you that I have found this is something we need to give our most careful attention.

Not long since I was called upon to hold an investigation of some poultry meat that had been tainted from such sources, and we found that poultry meat absolutely and positively unfit for human food. We are so careful at our poultry plant and we have now had years of experience in handling thousands of fowls, I want to say that along this particular line we are so careful that even though a team is passing through those poultry parts and should happen to drop voidings, it is taken away, so that they do not have access to such things and do not acquire the habit.

Now here we have in the front of this building almost a plank over these buildings. There is a green growing crop. At Valley Farm we are not fencing particularly, we are not confining those fowls to anything particular other than they must not go over on the neighbor's land, so when we begin here, at the line between our farm and our neighbors, we begin and fence, come across, say, for instance to that poultry house there, from there to the next and from there around the cove; then we just swing those fowls back and forth and they have access to 150 acres on this side and 150 acres, or approximately so, on the other, and that is all the fencing we are doing; and after they have been over on this side consuming one of the crops I have called your attention to that is so needful in the rearing of those fowls, then in the next picture we open the fence and they have access to this crop. They dropped down in here so quickly that we didn't get very much, but you will see what happened later on.

A Member: Are the walls of those houses single board thickness?

MR. PHILLIPS: They are single boards lined with very good water-proofing felt inside. I have called your attention to the way in which we spread those colony houses out over the farm. I suppose in that view there is possibly 15 acres there and you see the fowls have access to the range, have access to the green crops and surely it is very essential to success. Now in the rear there we have the old orchard. That was an old, dilapidated orchard.

A Member: What is your green crop?

MR. PHILLIPS: Clover, alfalfa, oats, wheat, most anything that will grow, according to the season of the year. On this land we have grown as much as four and five crops as we will see a little later on, and they do the rest of the job. That orchard is an ideal place for those chicks. Distribute those buildings all around through the orchard and then have a nice green growing crop there and then the old orchard furnishes the needed shade and they furnish something for that old orchard that has been very beneficial to it, fertilizing the orchard and it is improving; it is not ideal yet, but I want to say that it would be well if many of the farmers of the State of Pennsylvania would utilize their orchards for the growing of their fowls. It is very beneficial indeed, providing that orchard has a suitable exposure. We have on the top, at the knoll there, our breeding plant; it is absolutely and entirely separate from all the rest of our plant, and we are keeping there anywhere from 7,000 to 10,000 fowls.

Friends, you can get a thought there that I will say to you is very valuable indeed. Why have all those eggs? On these farms, even though you are keeping only a few fowls, why have them all fertile when the very egg that the consumer wants is just the opposite? Think of this lesson I am bringing before you if it is of value to you, and think carefully of those colony houses and what may be done even though you are only handling a few fowls. There is the land after the harvesters completed the harvesting of the crop, and it did not take them very long to do it. Thousands of fowls can trim a crop pretty quickly. They took in all they could with the camera, and I presume there might be 35 or 40 acres in that scene. This is all green growing crops through here and out here and along here is one of those large houses and so on around, and they do the harvesting and then are swung back, and so the work goes on. After the harvester then comes the plow. We must be very careful of the soil where we are keeping fowls as we are on this land, keeping thousands of them, and we have been in the work now for quite a number of years and the unexpected has never happened and we propose to try and keep it in that way. This soil then is all turned over. The plow has just finished the job here, even underneath the portion of the building that the fowls have access to; it is all turned over and that soil is all sweetened and the crop is grown and the work continued.

This is a picture that is possibly not as clear as I would have it, but I called our attention to the fact that we had some trouble with muslin curtains, and I think sometimes that we have expected the muslin curtain to do a little too much for us. Friends, we found this trouble in those buildings sometimes when we had the southerly storm and the southeasterly storm and the southwesterly storm, as we have over in the western part of the State, and I learned, after working the greater part of the winter in this part of the State, that you have them down here also. The trouble is sometimes the storm would beat through those muslin curtains and we would have moisture inside the building, and I absolutely will not have moisture inside of my poultry house, so we set about trying to prevent this, and then sometimes those buildings are closed down on these dark, dismal days and we have a change of temperature and there is where we must be on the job and everlastingly keeping after this thing, and here is what helped us out wonderfully and we have eliminated, to a great extent, the muslin curtains—a sort of baffle board in those windows. In the central part we have glass, and then a board sloping back as you see, and it gave us better light, better ventilation, considerably so, and we were not using the muslin curtain at all, and we absolutely and positively beat the storm, it had to stay out. This last winter was one of the hardest winters, I think, for the poultry men to handle things we have ever experienced, and such extreme changes. Oh, it kept us very busy indeed, and you know we could control the temperature of those buildings much better with that arrangement than we ever could with the muslin curtain, and the beauty of it was that we did not need to use the muslin curtain nearly as much as we have used it before, so that is offered for your benefit also. We have given some thought to some of the things which in my mind are very helpful in producing fowls and surrounding them with the needed things I have mentioned.

Now we will drop that thought for a while and take up the other side of my text, and that is the marketing. After we have gone to all this expense and after we have gone to all this trouble etc., then we should have returns, and if we do not, we go to the wall, that is all. Then here we come in this scene with the marketing process and at our plant there is the little Welsh pony coming in with a load of eggs. On the wagon there we have 2,000 eggs that are collected at the plant, double-deck as you see there, and the little pony has drawn them to the packing house; that is his job and he is a very busy fellow in and around that poultry plant, attending to his particular work. He brings them over to the packing house there once, twice, three times daily, according to the weather conditions; once, twice, three times daily; note that, ladies and gentlemen, and those eggs are not allowed to be out there in the poultry house where they should not be, coming in contact with filth possibly, crooks having access to them and all that kind of thing, possibly starting to debase and ruin that excellent egg; so I say according to the heat of the season, they are brought over to the packing house as you see here. Our fowls are all one kind of fowl. We are keeping thousands of fowls and they are all one kind, and it is a mighty job to keep that one kind right and going as we would handle them, and having just the one kind of fowl, we have in the picture here three distinct grades of eggs. We have four, but the other grade does not appear here. But here, as to size and as to color, marketable eggs, we have three grades. Now while those fowls are all one kind of fowls, they are all supposed to lay a white egg. Some of them lay an egg just a little pinker than the other. Is it wise for us to properly prepare that which we have produced and gone to so much trouble and expense about or is it a proper thing for you and me to pack that and hand it over to the producer in a haphazard way?

And I want to say to you, friends, that everywhere I go, I find the farmer doing that very kind of thing, handing over his product in a more or less haphazard manner. Why we will never succeed, and I want to say to you, ladies and gentlemen, after having years of experience in sorting those eggs up, if we did not grade them up and use every thought relative to this work, we would never have succeeded in the marketing of those eggs as we have done; we would have fallen short, wonderfully and fearfully. Yes, as to size and color, etc., we have three grades of eggs. Then there is another grade there, the eggs that are possibly damaged, undersized, too small to offer, on the market, they do not appear, neither do they appear when the customer sees the package.

After we have graded those eggs and packed them very carefully, we have given, as I have hinted, some very careful thought, and here

I have an egg carton that I think possibly I can offer a few suggestions that will be helpful in a general way. After the process as you have seen it on the screen, then we grade those eggs up and pack them in these boxes. Now here is a rather nice, neat, attractive package. I take pleasure in saying that I designed this box, because I am proud of it. There is a nice, neat attractive package made from good paper, and to improve upon the neatness of the package—understand our eggs are all white or nearly so as we can get them—the interior of that package is a nice tint of blue. Just imagine when that egg is graded up nicely and lays in that nice neat package, how attractive it is and how it brings out the beautiful white of the egg. Now I say that is neat and attractive; and ladies and gentlemen, I want to say to you that we have found for a positive fact that it pays to put these packages of eggs up in as neat and attractive a manner as is it possible for us to do it, and I believe that it will pay any farmer in the State of Pennsylvania or the United States, I care not what package he is producing and preparing for the market, it will pay him to bestow all the neatness upon that package that it is possible for him to bestow upon it, and if he does such work as that, it will have a tendency to elevate him beyond his dreams.

Now we risk something more with this package; it pays to advertise, ladies and gentlemen. There are many farmers in the State of Pennsylvania who never think of advertising at all. There are positively many farmers in the State of Pennsylvania who never advertise, and we have found that it pays and pays very well indeed to advertise. Listen; this last spring I said to our druggist over there "the farmers will be needing the material to treat their oats for smut, there will be quite a demand for that." I said to this druggist, "you have that material on hand, advertise and the farmers will know it and I imagine you will have quite a sale for the material." He took the suggestion. Later on I saw that man. He said, "Phillips, it surely pays to advertise, because of the advertising of that material, we have sold jug full after jug full of that stuff; we have handled it until we are blame near stunk out of the store. It is wonderful what advertising will do." I thought on that box I would have an advertisement, so on the side we have "Eggs from Valley Poultry Farms." There is a mistake there that has cost us money. You all know at the present time because there has been so much said of us in the papers, etc., and this advertising, you know where we are and who is operating Valley Farms, but if it had not been for this extensive advertising you would not have known it.

I imagined some years ago when we selected that name that we possibly had the idea of something fancy in our minds, so we thought of that name, ladies and gentlemen. If I was naming that and had that advertising to do again—we have gone too far with this now, but if I had it to do over, it would be "Eggs from E. L. Phillips & Sons' Poultry Farms." On the top of the box I thought that customers would like some sort of a drawing card, and at the top, I said "We lay white eggs." If he wanted to know what kind of an egg that was, he could read the next statement, "Produced by E. L. Phillips & Sons, New Bethlehem, Pa.; shipping point, Sligo, Pa."

We have been doing the very best we could to fill that package with eggs, grading them up in the very best form possible for us to do. But I want to say to you that it has been a wonderful help to us indeed to use all this effort and we have been doing everything we possibly could to fill that egg carton with the very best the world can produce, and we have been chucking into that box all the honesty possible to crowd into it as far as we know, and I will say to you tonight that it has been the best investment of all the investments of hundreds and even thousands of dollars we have ever spent—all the honesty we can crowd into it. Then, after that care is bestowed upon that package, for instance, the eggs are placed in this package today, the eggs produced today are brought into the packing house and this grading and sorting and packing is all completed and the egg produced today is loaded on the motor next morning and here I am myself with overalls and all that going out the next morning in the motor car with 210 dozen eggs; so we get on that motor car in the morning before breakfast—that is my job at home and I have made a great many trips this spring and I rush off to the station five miles distant so that we get the early express train which leaves the station at 6.30 in the morning and the consumer has that egg on his table tomorrow for lunch, and he has been saying to us, "E. L. Phillips & Sons, come right on with that egg, we are mightily interested;" and today, ladies and gentlemen, the demand comes from three states and they are keeping us going some and we have found that that is a pretty good system in getting it in that way. If you have any to beat it, come right along, because we need your help.

But there is a draw-back to all this; we always have our troubles, and here it comes. Now, ladies and gentlemen, there is E. L. Phillips and one of his sons and two of our teams out on the road, and you wonder how that comes in in the marketing of poultry products. I will tell you how it comes in; it comes in very well indeed. This road here, as you see it—this picture was taken the 5th of April this year, and that road was in pretty good condition at that time; we had just started out there to drag it. I wanted you to see the condition of the road before we had a drag on it at all. The frost over in the western part of the State had gone out the latter part of March. By the 5th of April we had the road in very fair condition. That road, ladies and gentlemen, has been dragged up to this present time by E. L. Phillips & Sons seven times. We have been so interested in this matter because of things that follow, that we have been dragging the road for eleven years, free of cost. We have received in the eleven years only $2.35; and this road that we have kept in condition, is a tough sort of clay, very muddy indeed. A gentleman said to me, one of my neighbors, who used to be opposed to a road drag, "Nothing but a fool would use a road drag;" but he said to me this spring "E. L., if all the roads in the country had been dragged as that road has been, it would have been a wonder and help the farmers a whole lot." Said he, "That road would, during April, have served the purpose of driving an automobile fully 60% to 75% of the time," and we have had an awful wet muddy season over there this last April and May.

We have been dragging that road simply because we are much interested, because we need that road so badly. But then, as I said, there is a drawback to it, you know, when we come to line there, that road has been dragged once and once only since the season of 1915 until May 1st, 1916; and I said to that supervisor, "Oh please drag the road; I will pay you for it." That was over in the next township; I said, "I will pay you for it, go ahead and drag the road." I got him to drag that road once, and it is a main thoroughfare. He said, "It's no use, it's all tomfoolery." We had a road talk last night. He said, "It's all tomfoolery, there is no use in dragging that road, it is all foolishness;" but I persuaded him to drag it once, and that Ford car, loaded up with 210 dozen eggs, went over that road within an hour after he had dragged it, and he was standing by the road and he looked and wondered why the road was in a fearful condition in the morning and within an hour and a half's time, that motor car returned and was going through with a load of eggs again to the station, and he was working alongside of the road and I said, "Come on, hurrah, jump on;" and he made a dive and I slowed down and he jumped on that car and he went over the road. He said, "I didn't think you could get through." I said, "We are going through anyhow," and he said, "Blamed if we will," and I took that fellow on to the station, but that has been the last of that dragging and it has been a wonderful hindrance to us in getting our eggs to the market.

In the next township there is a very wide-awake, alert man there, a farmer; he is one of those fellows that is doing things, and he said to those farmers, "Gentlemen, I am going to start my saw mill tomorrow morning and I am going to saw out material and give you material sufficient to make and I will pay for the making of 25 drags that I am going to give you, and all I ask you to do is to drag the roads occasionally after a rain," and I'll be blamed if those farmers haven't turned that down.

Ladies and gentlemen, I want to say to you there are two things the farmer needs today: The one thing he needs and needs badly is to crowd within himself all the business ability that it is possible for him to crowd, in order that he may produce, as best he possibly can, and prepare his product for the market and hand it over to the consuming world in the best possible shape. But I believe today that the thing most needful to the farmer of anything I know of in helping him out in the marketing of his product whatever it may be, is good roads. I have kept that road in such shape that it could be used from January to January by a motor car, twelve months in the year, and that road, ladies and gentlemen, is a mighty help in time of need. But the thing we need is good roads, good permanent roads, and we should get them as fast as we possibly can, and next time we have an opportunity to get them, my suggestion to you is to let us get them. I thank you for your attention. (Applause)

MODERN FARM POULTRY MANAGEMENT.

By PROF. H. R. LEWIS, *Department of Poultry Husbandry, New Jersey Experiment Station, New Brunswick, N. J.*

Mr. Chairman and Members of the Pennsylvania State Board of Agriculture: It is always a pleasure to get back and meet you people, not only because I meet a lot of old friends, but also because I run into a lot of people who are mighty keen and mighty well interested in the poultry business. You people appreciate as well as I do that times are changing, and the poultry business now is entirely different from what it was five or ten years ago. If we are going to make a go out of it today, we have got to look at it from an entirely different aspect, got to look at it as a business, maybe a part of a larger business, but we have got to look at it as a business, and there is no time in the history of the world that business has been looked at in the detail way that it is today. The manufacturer or the merchant divides up his business into a great many different groups and he has it all down to almost mathematical precision and he pays a large amount of money to expert accountants to tell him at any time just what the different parts of his business are doing. And so it is in poultry work, it is coming more and more to that status where we have got to know just what we are doing in every line of the work if we are going to make the most out of it.

Now, as I said, the poultry business from the farmer's standpoint, he has got to consider three definite phases in their broadest aspect: First, those problems which have to do with production, and many of them have been ably and forcefully pointed out by Mr. Phillips from his own practical experience in operating that large commercial plant; and, secondly, he has got to concern himself more and more with the details of distribution. The middleman takes too much, possibly, of the consumer's dollar; 45 cents out of every dollar that is received or rather that is paid by the consumer for the eggs comes back to the farmer; the rest of it is used in distribution and so we have got to make that one problem a study, and the third problem has to do with them all, and it is really the business side of it; it is the consolidated grouping of all lines of that business together for the maximum amount of efficiency, producing, if we want to, as many different kinds of products as that poultry farm will produce, marketing everything marketable at the most economical time, keeping records so we will know where we are at and considering the whole problem of our work from a business standpoint.

Now, then, with the use of the slides, if we can have the lights out, I am going to try, and rather hastily, but in some detail in certain special points, go over some of these things which I briefly mentioned, those things which are more or less common knowledge to us I will just mention in passing; those things which, in the last year especially, we have found out and come to appreciate more and more, I shall spend more time upon.

First, problems of production. The manufacturer or the farmer or the poultryman is primarily one who makes goods to sell, and obviously we have got to have the goods to sell before we can consider problems of selling. So production is fundamental, and the poultry farmer, if he is going to produce the maximum product at a profit, he has got to consider that above everything else; he has got to be a farmer and a producer first. Now, then, the poultry farmer is concerned from the standpoint of production in maintaining a healthy, vigorous flock, free from disease, in an environment which is conducive to the best production, and hence he has got to provide those birds with suitable houses, fresh air, plenty of sunlight, dryness and plenty of room. Those things have got to be present if that flock is going to produce its best, if it is going to pay any kind of a profit on the labor and the money invested in the enterprise; and how many times we go around New Jersey, and I suppose you people here in Pennsylvania see men trying to do it without paying any attention to that problem, just as the first picture which Mr. Phillips threw on the screen, so ably pointed out.

Here is a picture which shows a house, not as crude as the one shown earlier, yet shows a faulty construction, solid glass sash, no adequate means of ventilation—a refrigerator in cold weather and a hot box in hot weather. That problem of housing and providing those conditions has been largely solved by means of so-called fresh air houses which the next picture, I believe, will show, houses which have muslin fronts, possibly, some glass, and even in some of our South Jersey sections around Vineland, no muslin at all is used, but a heavy projecting drip, so-called, is put out over the front of the building two or three feet to keep driving storms out, and the birds are kept under those conditions there where they could not be, possibly, in your own State of Pennsylvania. Fresh air, plenty of sunlight and absolute dryness are the three fundamentals of that poultry house.

I want to take just a minute to go over one or two details of this little house you see here. For a long time past, some three years, the New Jersey Experiment Station has been trying to work out a standard poultry house. We know that in some places and under certain conditions, the exact type of house will vary some; but we wanted to get it as near standard as possible and hence we worked out this multiple-unit idea. You see here this shows a double section, (the house is 40 feet long); this is half a section, coming from here over to the center, 20 feet, and it is 20 feet deep, 400 square feet, with a capacity of 100 birds. It is built on a uniform basis. The farmer keeping 100 birds can build one unit; if he desires to increase to 200 or 300 or 500, he can increase in the same proportion. There are a number of features about that house which will interest you, I am sure. First, one or two details about the plan, the shed roof construction; the most economical to build, 16 to 20 feet in depth; our plans call for 20; it gets the birds back away from the wind and exposure; it is 8 or 8½ feet high in front and 5 feet high in the back, and there are hundreds and hundreds of these houses, ranging in length from 20 to 25 feet in New Jersey, and we have yet to hear a kick or complaint if they are constructed properly.

One or two details which are of special interest at this time, and that is the question of maintaining dryness, the question of maintaining rat-proof conditions in the house, the question of maintaining permanence and ease of cleaning—that has to do with the details, the foundation of floor construction. These houses on Mr. Phillips' plant are elevated. There may be certain conditions which make that desirable in certain locations and on certain farms; for our soils in New Jersey and our locations there and we believe in the majority of cases, the best results are secured with the least expenditure of money by putting the house on the ground, on a good concrete foundation, putting inside of that foundation a foot or 10 or 12 inches of cinders, and over that a coat of concrete which is float-finished. That foundation with us is by far the best, both from the standpoint of cost and efficiency. The labor of cleaning and the sanitary feature is of special importance in that type. Then a thing which I believe could well be put into every poultry house, is a small opening in the back, some such construction as you see here, for use in June, July, August and September, when it is exceptionally hot and we want to do everything we can to cool that house off and make it congenial as possible to the birds. It can be put in when the house is built or put into old houses. By actual temperature test, the use of those ventilators in the back has cooled houses down at least 11 degrees below similar houses that did not have these ventilators open. And then the cost of this unit construction will interest us, especially this figure here, the cost per bird, which is really the basis for figuring the cost per house, allowing four square feet; that is the cost for material, 88 cents a bird, and adding to that the cost of labor, whatever it may be; and I don't like to specify the exact cost of labor because it varies, but assuming it is one-fourth the cost of material, that brings the cost per bird up to a little over a dollar. I simply bring out this point of uniform conditions, so-called standard unit houses, which will create an environment, which will keep the flock happy and contented and healthful, as one of the fundamental problems of the producer.

Now the second problem, as I see it, which confronts the producer, is that of providing for his flock food material in sufficient amounts and economical and of the right character so that he can maintain that egg production which he must have if he is going to make a profit from the venture. In order for him to intelligently feed those birds, he has got to have his mind pretty well made up as to the reason for which he supplies certain definite feeds, and that would naturally call our attention to the nature of the product for which we are feeding. In feeding a laying hen, we have got to maintain the organism, the body, build up the waste which is going on. The bird's body, as you see there, contains over 50% of water, over 20% of protein or nitrogenous material, lean meat, etc., and then the egg, which is the direct product we are after, is two-thirds water and over 13% protein; or, as you will see by looking at that, about a third of the dry matter of an egg is protein compounds or nitrogenous material. If there is a relation between the type of food we must feed and the character of product which we are after, which there is, it is obvious that we have got to feed that laying flock, if we are going to get a maximum of egg production from them, a large amount of water and also considerable protein or nitrogenous food material in addition to a certain amount of ash and carbohydrates and fat, the latter two being used quite largely as energy formers, heat producers, they make the heat which keeps the bird's body warm and generates the energy which enables the bird to move around.

Just how shall these ingredients be supplied? I do not believe we can do it in any better way than keeping before the birds all the time, in large, self-feeding hoppers, some good standard dry mash. There are dozens of good commercial mashes on the market. Many of you can go to the grain store and buy ground grains and mix up a good mash. We in Jersey use this: I don't know that it is the best, but it has been giving us excellent results for a number of years, and that is really the test of a poultry ration. We are going to use this mash just as you see it in our egg-laying contest at Vineland. Variety, palatability, economy; the prices you see here are not those prevailing at this particular time, but it is impossible to make a new slide each time, so they will have to be taken subject to price variation. Meat perhaps is used as the source of animal protein, 20% of the dry mash being from that particular source. This material is put in large hoppers, such as you see here, placed in the poultry houses, built right into the building, none of these small, metal hoppers, which are costly, require a good deal of attention to take care of them and waste food. We can build a hopper of this type, get no wastage, get a large feeding surface and have it so fixed that the birds themselves can determine and balance their own rations, because they can do it better than we can, and then we supplement that dry mash with a good scratch grain ration, feeding it morning and night, in enough litter to compel the exercise so fundamental to health and production. With us, we split the grain ration in two, and feed the wheat and oats in the morning, because we do not believe the birds need the large corn diet at that time, feeding only relatively small amounts in the morning. The primary object of that early morning feed is exercise. At night we feed a more varied ration, containing the cracked corn and buckwheat or carbohydrates, heating feed, which keeps up the body temperature at night, which is in large part kept up in the daytime by activity and exercise which the bird is induced to make.

Simplicity in the poultry ration is a big advantage; do not make it too complicated; a good dry mash, some variety and a good scratch grain ration intelligently fed will make any birds produce a goodly number of eggs. A little feature which has recently been promoted extensively but which by some few, has been known and appreciated for sometime, is the value of skim milk in feeding poultry. Those who raise chickens in large numbers know the great value of sour skim milk in feeding young chicks, and we at the station at New Brunswick have been running a number of experiments in feeding our skim milk to laying hens, and we found it a very profitable practice, buying it in 40 quart cans and feeding in pans under the front of the houses just as we would water, having the pan fixed so that the birds cannot get in it, and being careful to rinse the pan out carefully between each feeding.

A record of a flock of birds which were fed skim milk and a flock which were not might interest you. This shows a rather greater difference than we find in the majority of cases, but it is an absolute record of two pens of a 100 birds each; the pen on the left, No. 25, laying during the year, 8383 eggs, and the pen on the right, which received skim milk in addition to the uniform ration, laid 12,000 eggs; and coming down to the profit in the above feed, we say that pen No. 25 or the no skim milk pen, paid $156.93 profit, or about $1.50 a bird, and pen No. 22 a profit of $248.63, or a profit of $2.50 a bird, or a difference primarily due to the introduction of the sour skim milk kept before the birds all the time, of very nearly a dollar a bird.

A Member: After you take out the mortality and the cost of labor, how is that affected?

PROF. LEWIS: The mortality is by far less in the skim milk pen and there is very little difference in the labor. This is not a mash, just sour skim milk in a pan. We kept water there just the same, but the way those birds drink that sour skim milk—they drink it ravenously. Sour skim milk in our estimation is far superior to sweet milk. In the first place, it is easier to feed because the milk is going to sour anyway; in the second place, the presence of the lactic acid, which is only present in the sour milk, seems to act as an internal disinfectant or stimulant, cleaning the digestive system and keeping the birds physically fit. Again, sour skim milk is probably five or ten times more palatable than ordinary sweet skim milk. Experiments at a number of stations in Maine, Connecticut, Rhode Island and in our own work and some at Cornell, show very material advantages for the feeding of the sour product, that is thick, clabbed skim milk. These figures can be taken for what they are worth, and I might say that in a number of other experiments, if balanced up with this, would show an average profit per bird where skim milk was fed, an increased profit of about 60 cents. This particular one showed the highest of any comparison we had. We cut the meat down slightly where we feed skim milk. In this particular pen, we did not, they all had 20% of meat; our idea was to keep everything the same in both pens and just add to it the sour milk in one case. If I were feeding a commercial flock sour skim milk, I should cut the meat scrap down to 20% right off.

A Member: How often do you scald your milk dish?

PROF. LEWIS: Once a week, sometimes twice a week. We rinse them out with clean water daily before the new supply is put in.

Now we come to another point, using every possible effort to provide that high water content so necessary in the bird's body and the egg. We can do that during the summer by running the flocks over green grass ranges and the use of crops as Mr. Phillips discussed, and here you see a flock of pullets feeding on alfalfa, an ideal type of succulent feed, palatable, containing a large amount of protein and having a high water content. Those of us who keep large numbers of layers, even the farmer who keeps 50 or 100 fowls, must, if he is going to get the best results of that flock, plan for some source of succulents for winter use, and I do not believe there is anything which will beat a mangel beet. You can get a large yield per acre, the birds relish them and it is a practice on the better managed plants to use that type of succulent. Where we find ourselves without beets and cannot buy them, we can go to grain sprouts from grain, oats being superior. Oats are certainly better than no succulent at all. The feeding problem would not be complete without saying a word about water content, the need of having for them at all times an abundant supply of water.

A Member: Would it be possible or liable to happen that each of the feeds of the composition will be put in separately and let the hen eat that if she wants it?

PROF. LEWIS: We have done some work along that line, putting in 30 hoppers in which we had 30 different kinds of feed, oats, wheat, barley, buckwheat, etc., and allowed the birds to choose the particular ingredients they wanted. I cannot remember exactly all of them, but it has been published in a number of feeding journals and I was very much interested in it. I remember that wheat lead, corn came next, oats next, barley next and the rest I cannot remember exactly, but the whole grains lead with wheat by far the preferable grain the birds would consume if given unrestricted ability to select from among a number.

A Member: What was the laying result?

PROF. LEWIS: They laid well. We did not do it to test production, but more to find out the natural inclination of the flock to select and what they would select. They laid very well, but there was no comparison between the pens that had their rations put in in their entirety. Leaving the feeding problem and coming to the vital problem of production that has to do with the importance of looking ahead, the importance of being sure that plans are laid so that five years hence the flock will be better than it is today; continuous improvement in the future generations can only be brought about through breeding, therefore everyone of us, whether we keep a few birds or a lot, ought to have a small parcel of land or a number of houses such as you saw in the previous picture, set aside from the regular poultry block in which special matings can be made for propagation or breeding purposes, picking out selected individuals, characterized by some special, desirable feature, and breeding from those special pens and not mating up large flocks that we do not need for hatching eggs; putting into that pen or putting into a few of those pens, the trap-nest.

A trap-nest will give a man a wonderful amount of information. The farmer with a few birds possibly cannot afford to use it and will have to use visual characteristics and his own knowledge of birds and their appearance to make his selection, but the man who is in it commercially, who is going to stay in it, is coming to the time when he has got to use a trap-nest more and more, just as the dairyman came to the time when he had to use the milk scales and the Babcock test. And then we come to the time when that trap-nest shows us wonderful results and enables us to pick out the hens that are good producers, and if carried through a number of generations, it enables us to tell the hens which were the mothers of high producing pullets and the mothers of cockerels which themselves were the sires of high producing pullets; in other words, progeny testing is the thing the poultry man is coming to very rapidly. The fact that the ability of a bird to breed is going to be measured by the characteristics found in her progeny.

Here is a hen which is familiar to a good many Pennsylvania people, a New Jersey bred bird; in one of the recent egg-laying contests, a Columbian-Plymouth Rock, which laid 286 eggs. What a short amount of time during the year that hen was loafing. When we get hens that lay up into the 200 egg zone, we have got phenomenal individuals which, if they possess vigor, stamina and vitality, ought to be bred from, and so I want to emphasize that point of breeding to increase the quality in future generations. I will give you a little history in that connection; a hen which possibly I have shown before, which laid 246 eggs in her pullet year and continued to lay heavily from that time to the present and which has longevity and vigor and stamina and which has been the foundation of a line of heavy producing birds, the highest one of which has laid 297 eggs, and many of them coming around the same zone which this particular bird here occupies.

And how was that line of heavy producing birds established? It was by selecting cockerels from this hen, breeding them back to their mother and to other high producing hens; that is the point. The male bird to the poultry breeder is worthy of far more consideration than we often give him. We often kill them off after they have been used for breeding one year, without any knowledge or effort on our part to determine whether the daughters from those particular males were good or bad. If we can find a male bird that invariably produces high fecundity pullets, he is of inestimable value to keep for a number of years, and vice versa.

A little story might illustrate: We bought a cockerel from a large exhibition plant in New Jersey a few years ago, number 91. Three years after we bought him, I had occasion to look over a number of high-pedigree performances and found a lot of hens which were low performance, and some of these hens or pullets were out of some of our heaviest producing birds of an older generation, and when I came to trace those back, we found there had never been a daughter from that male bird number 91, which had laid over 90 eggs in a year. He was an excellent bird for carriage but he simply did not posses the power of fecundity, and if we are going to produce eggs commercially, we have got to breed for them as well as feed for them. But we do not want to lose sight of the fact that the inherent vigor of the stock is worthy of as much consideration as anything else, because, unless we have that inherited vigor and vitality, the bird cannot develop these other traits to the fullest degree, so we do not want to breed a bird of this type, no matter what history he may have for wind, and we'd rather take a bird that was not quite such a pattern but which had characteristics of vigor and vitality, a high tail and a deep body, thick through in all parts, sprightly and not the drooping and emaciated type which you saw in the previous picture. That same condition is carried through its progeny which comes from these birds, if they are bred from the four chicks over in the left-hand corner, all of the same age, and some in the upper right-hand corner, all of the same age. I had occasion to go down to one of our colony brooder houses the other day in which there were 200 Barred Plymouth Rock chicks. There were twenty birds undersized, small, 6 weeks old, feathered slowly, and the differences were due almost entirely to inherited traits, so we want to select and cull for vigor and vitality with the idea of breeding for these characters. We do not want to stop culling with the breeding pen; we want to keep right on in the case of the youngsters through the growing period, weeding out birds which look like that stilty Barred Plymouth Rock cockerel in the lower picture and like the knock-kneed Rhode Island Red in the upper one. It is just a question of taking the time and putting them into practice—the traits we all know.

Coming to another point in production, that is the question of propagation, the hatching work, the farmer with only a few eggs uses the hen. A great many farmers we visit in New Jersey I know get very poor results with the hen, simply because they do not take any pains with her, do not see that she is kept free from lice and do not give her a good nest; they think she can lay and hatch eggs under any circumstances, but that is not so. Poultry management means careful attention. The commercial man or even the farmer using an incubator has come to appreciate that if he is going to get good hatches he has got to take care of that machine and keep it in good sanitary condition, keep it clean and working properly. We cannot let this poultry business go in a slip-shod way, we cannot carry on that practice very long before it is going to have us down and out.

In hatching work there is one thing I want to especially bring out, and that is this question of early hatching. I will give you a few figures which will interest you. For some time we have been discussing and advocating relatively early hatching; we appreciate the fact that Leghorn, is hatched in April, probably in the majority of locations, will come into egg production about the right time in the fall so that she will lay fairly well in the winter. If hatched too late, she will not mature early enough; if hatched too early, she will go into a moult. There is a time in the poultry man's calendar during the months of August, September, October and early November, during which time the older hens are moulting and very few eggs are consequently being laid by them. That is also just previous to the time when the normal spring hatched pullets come into maturity, and hence we are not getting many eggs from them. It is the slack time of the year as regards the egg basket.

At the New Jersey Experiment Station, in co-operation with some ten farmers of the state, we have been trying the question of bringing out a small percentage of the pullets relatively early, if you are hatching to get sires for seven hundred pullets, bring out a couple of hundred in February. Just let me give you a few figures showing the results of a flock of February hatched birds. Two hundred hens in this instance laid during the year 26,000 eggs, starting August 1st. It is true they went into a moult in December and did not lay very much during December and January, but they laid a remarkable production in September and October and early November and made a good big profit during those four months. There is one misprint here; this average profit per bird should be $2.22. That is above feed. Labor is not deducted nor is interest deducted. The average production per bird was only 138 eggs, but just see what you received for eggs during the months, for example, of August, September, October and November.

Now what are some of the advantages of February hatching? Eggs in the fall, when the yearlings are moulting, fall eggs bring high prices. February pullets make good breeders the following spring; February cockerels make the best breeders; they have time to mature; the surplus cockerels which are produced bring high prices as broilers; they go on the market before the slump in the broiler trade is reached. The chicks make excellent growth in the summer, and there are innumerable advantages which come to us by putting into practice the bringing off of some early birds.

A Member: Is there any advantage in June hatches?

PROF. LEWIS: I do not think so, in general, for this reason, that they come out during the summer and must be breeded during very hot, dry weather, and it is our experience that June hatched birds grow slower, mature at smaller size and do not make the efficient individuals that the April or May or earlier chicks do. If you have got a special trade or a particular condition, it may be an advantage.

One or two words about breeding, which is a problem of production. The time was, not so many years ago, when we used to have to fool and fuss with a little equipment of this kind. They are obsolete, out of date, not useful; they do not give us the greatest efficiency. Then there was the time when we all believed in the long pipe brook house, and some of us are using modifications of that today, this being an equipment in which the heat is supplied in pipes underneath the cupboard, but recent developments have brought about a type of equipment much more satisfactory, and that is the coal burning brooder stove. The coal burning brooder stove in our own state has been responsible for brooding successfully in New Jersey this year the largest percentage of chicks the state has ever known. You rarely see a flock of any size in New Jersey in which the chicks are not being brooded in the colony stove. This shows a type we find very popular; no curtain, all deflected heat from near the stove to the outer walls of the building; there is a uniform variation in temperature from very hot to cool; the chicks can find the temperature themselves which meets their own body requirements. These stoves are located in buildings somewhat of this type that you see here. The labor item is cut down to a minimum and large flocks are handled, 300 to 500, rarely over 500, successfully. I believe it is going to revolutionize the poultry business in so far as the brooding work is concerned.

One point in the production end, as far as breeding is concerned, and that is the great value of bone in the chick ration. I published a circular a short time ago giving some explicit figures dealing with that problem. I simply show here some sources of bone, dry granulated bone you can get for about $2.00 a hundred; then the fish scrap, if you can get it, is an excellent supply of bone, and of course there is more or less bone in high grade meat scrap.

A Member: Is there much danger in feeding bone to chicks?

PROF. LEWIS: A good, dry granulated bone, not fertilizer bone, which has been treated, but a good dry granulated bone which you can purchase as feed bone, I see no danger at all in feeding it. Fertilizer bone, a great deal I imagine is acid treated, at least we find that to be the case, so we specify, whenever we buy bone, that it shall be a feed bone, specially prepared for feeding purposes; that is manufactured in much the same way as meat scrap is prepared, rendered and cooked in caldrons and the fat taken out under pressure and at a high temperature. I believe in it strongly. There is 25% of protein and 23% of phosphoric acid in this dry granulated bone which you can get for about $2.00 a hundred.

A Member: How about green bone?

PROF. LEWIS: I would hesitate to recommend that. The labor involved, the questionable quality, the fact that you can get your birds off condition, are all things which in my mind generally tend to discountenance it. But there are men who have relatively small flocks who use it as a constant source of supply and find it successful.

A Member: Do you feed small chicks potatoes?

PROF. LEWIS: No, we feed no potatoes at all in our work, because we do not have them. Personally, I think that potatoes have to be fed with a good deal of care; they are rather starchy, and a bird gets a good deal of carbohydrate material anyway, and I'd rather feed beets than potatoes, which are of a more sugary nature. In this production end, every poultry farm is vitally interested in getting first full maximum number of those pullets, birds which can go into the laying houses, to replace the older ones which have passed their usefulness for egg production.

I will just show you a few pictures which will cover the ground Mr. Phillips went over in that connection, namely the value of free range. The commercial man, putting his birds in the orchard on extensive areas, growing a rotation of green crops for them and providing shade and plenty of water for them to drink, and in the small flocks there is many a cozy nook in some field or pasture where there is a running stream, where colony houses can be located, no fences, and where the birds can run under natural conditions. In New Jersey we have to contend and fight continually the practice in our suburban communities of growing chicks in confinement in back yards. Then, cutting the labor down on the range by feeding in the hoppers, making it as mechanical as you possibly can, in addition to the economical supply of a constant amount and abundance of water, shade, green feed, plenty of water to drink and the plan of having a range over which they may run, will complete the producing problems of the poultryman in that it will enable him to have in the fall an abundant supply of good, vigorous, husky pullets without which, no matter how careful he is in feeding them or caring for them, if he does not have that foundation to start with, he will not succeed in making a cent out of the business.

I am informed that the time is up and I want to say, in conclusion, two things: The selling problems, which were the second group which I mentioned, that is the problems of distribution, were covered by Mr. Phillips, and everything which he said I put a heavy O. K. to; more attention to detail, more attention to a neat, attractive package and a uniform product as regards quality are the things we have got to come to.

I want to make two announcements: one is regarding our egg laying contest at Vineland. Any of you people interested in something new along that line, address me a postal card at New Brunswick and I will be glad to send you all the information I can. We are putting on a three year contest, which is not only in egg laying but in poultry breeding as well; ten pullets the first year, kept the second year pedigreed for two years; we breed from them the second year and the third year put their daughters back into the pens, so it is really progeny testing and we believe it will give us a great mass of information and is a great step in advance of any contest of that kind ever yet run.

I want to comment favorably on one thing I have heard a great deal of since I have been here, and that is your rooster week, the fact that Pennsylvania has come out for the production of infertile eggs at all times except the breeding season, and that sets a time at which the farmers and poultrymen can separate the breeding males and, if useful, put them in a pen by themselves, and if not, market them, and then produce, all the rest of the year, an infertile egg which is materially superior for market purpose.

ADDRESS

By HON. C. E. CAROTHERS, *Director of Institutes.*

We have come to one of the most important sessions of this Normal Institute, for the reason, first, that we are going to review to a certain extent the work of the last season and discuss for a short time the work for the coming year.

Many of those now present have no doubt been regular in their attendance at these so called "Round-ups" for many years. While I have attended quite a few Farmers' Institutes held under the auspices of the Agricultural Department of the State, this, as you know, is the first that I have attended as your Deputy Secretary and Director of Institutes. Your former Deputy and Director, Mr. Martin, whom we are glad to have with us at this time, devoted a great deal of time, hard labor and attention to this work, and when I entered upon my duties this year in the midst of the Institute season I found the work well in hand and the Department surrounded with a corps of able and efficient instructors, men, in my judgment, well qualified by experience and practical knowledge to discuss the subjects with which they had to do. From my short acquaintance with them, my first thought is that it may be hard to improve on them; yet it shall be our purpose if possible to bring our Institutes to an even higher standard of usefulness to the farmers of this great State.

I am sorry that I do not have a more extended and personal acquaintance with the Chairmen of the different counties of the State, and on whom so much depends as to the success or failure of our Institute work in their respective counties. I will say to the Chairmen here that I care not what your affiliations might be or your politics are, nor what your religious creed may be, we shall expect of you, honest, energetic and efficient service in promoting the upbuilding of the Institutes in your immediate locality. Each member of the State Board who acts as Chairman are chosen by the Agricultural Society or different Fair Associations, I presume are selected, at least, I hope so, on account of your interest in agriculture and the uplift along this line in your communities. In accepting this position and by virtue of which you are now here, you signified your willingness to engage in this work and to do all in your power to create sentiment, to work up a good attendance and an increased interest in the Institutes in your respective sections and bring about in every way their more general success. I am not familiar enough with your service in the past to either commend or criticize; yet I feel it is sufficient at this time for me to say, representing as I do the Agricultural Department of the State in this line of work, that where and when the Department feels that we are not getting your full service, your resignation will be asked for and others will be appointed in your stead.

Now it may be well enough for us to consider for a moment how we may stimulate and increase the interest in our local Institutes. It may be assuming a great deal on my part in making suggestions to those of you who have been engaged in this work for so many years; yet I feel much like asking, Have you done all you could in the past to thoroughly advertise your Institute by posters, etc.? Are you in close touch with the editor of your local newspaper? If not, cultivate an acquaintance with him that he may assist you in getting your Institute thoroughly before your people. In this case, as all others, it pays to advertise, particularly if what you are offering has merit.

On the other hand, you are all no doubt well known by the ministers of your section, the County Superintendent of the schools, the High School teachers, the Farm Bureaus, if you have them, your Farm Agent, if possible, if you have one. Get all these agencies enlisted in your work in getting their most hearty co-operation in the work of furthering the interest of agriculture. Let us then return to our homes from this Institute with a full determination in our own minds that we will take up this work in our respective counties with renewed vigor and a special effort to increase the interest and attendance at the Institutes to be held the coming year.

We have in Pennsylvania our State Department of Agriculture, State College, Grange organizations, Farm Bureaus, with their agents, the agricultural press, etc. But at the head of all is the

Agricultural Department of the State, and as I understand the present administration and knowing the present Secretary, Mr. Patton, as I believe that I do, you will find him ever ready to co-operate with all minor organizations in the State for the further advancement of agriculture. Let us then from the Department down, members of the State Agricultural Society, County Chairmen, Institute workers, Farm Advisers, the State College, Farm Bureaus, Farm Agents, Grange organizations, the agricultural press, co-operate and work together in absolute harmony for the furthering of the agricultural interests of this great State and the upbuilding of the church, the home and the school.

Now a few words relative to the work of the past year: The Department of Agriculture held during the season of 1915-16, 397 days of Institutes with an attendance of 150,808 as compared with 436 days with an attendance of 162,269 the previous season. During the season of 1914-15 we had an appropriation of $22,500.00, while for this work in 1915-16 we had only $20,000.00. The Governor, in order to keep within the revenue available, was compelled to reduce the appropriations of the different Departments of the State; the Institute appropriation being reduced from $45,000.00 to $40,000.00 for two years, making our working capital $20,000.00 per annum instead of $22,500.00. Therefore, you will see our average in attendance for the past season is somewhat in advance of the previous year. It is my hope, with the co-operation of the State Board of Agriculture and Farmers' Institute workers, to go to the next Legislature with a request for $60,000.00 for two years to carry on this very important work, and I feel that if we all work to this end we will be successful.

You no doubt are aware of the very valuable asset we have to agriculture by the State furnishing ten Farm Advisers who work under the direction of the Secretary of Agriculture, whose duty it is to aid the farmers in the manner of adopting scientific and approved methods. These experts take up crop rotation, soil building, plant growth, dairy husbandry in all its branches, together with poultry management and farm drainage, of which there is no greater need for the development of thousands of farms within the State. The market gardener and fruit grower has been fortified in his work, also the co-operation in buying and selling of farm products has directed thousands of farmers as to the best location for marketing their products; and home sanitation and household economics is not the least important branch in this work as it relates to the health, comfort and happiness of the farm homes.

I do not want to take up much of your time going into details as I appreciate we have a very full program before us. However, at this time I want to express my gratitude for the kind co-operation of the County Chairmen of Institutes, Institute Lecturers, the Faculty of the State College and other agricultural organizations, who, upon my entering upon this work, have offered every assistance possible, and I want to assure you that it will be my effort to continue the building up of this valuable educational feature of the Department's work.

A BRIEF REVIEW OF THE PAST YEAR'S WORK BY SECTION LEADERS

The CHAIRMAN: Our program to-day provides for our farm advisers and lecturers with "A Brief Review of the Past Year's Work by Section Leaders," and first on the program, is Mr. Sheldon W. Funk, with whom you are all well acquainted.

MR. FUNK: Mr. Chairman, Members of the Board, Institute Lecturers, Ladies and Gentlemen: As a section leader I do not want to criticise the Institute work in Pennsylvania because I know that you people have all given it a great deal of thought. It has been carried on for a great number of years, and I do not believe that we can make any great improvement; but I do have a few suggestions which I would like to offer.

As most of you know, I had charge of Section 1, last year, and I think the attendance in the section was greater last year than it has been during any preceding year; that is, considering the number of days of Institutes. We had an average attendance of 500 daily, or a little bit over a thousand to every institute held in Section 1, and we had a few poor days, of course, due to bad weather conditions, but in most cases the attendance was very good and everything seemed to be working along very successfully. As far as the men whom I had with me, I think practically all of them were satisfactory. They all tried to do their best and I think they did do their best.

I have one suggestion to make to some of the newer lecturers, to study the territory a little bit that you expect to enter. We have the soil maps of the State that you can get hold of, and by looking over your territory, you can familiarize yourself with the soil conditions, and I know that it has helped me out a great deal. We had a little bit of trouble last year in not having men suited to the territory in a few cases, but the Secretary is taking that matter up this season and I think that is going to be remedied.

There was also a little bit of trouble along the line of advertising. Now I do not wish to criticise the County Chairmen; I do not believe that a man who is not paid and is doing the best he can should be criticised, but you men of course, the County Chairmen do not get into the different counties as we lecturers do and do not always know conditions, possibly, quite as well as we do, and I do not think you are going to take it in the wrong spirit if I offer a few suggestions, not that I want to criticise, but I have gotten into some counties where the institutes could not have been better. I don't think, where we had all the people that the hall would accommodate and sometimes a great many more, and then we would get into another county not very far away and the accommodations would not be the same. Possibly there were conditions I don't know anything about, but oftentimes I think those conditions could be changed a little bit.

Now in regard to the proper advertising of meetings, I know all of the County Chairmen put up their posters; but I do not believe it is going quite far enough, and I believe there are a few counties where a little more individual work will do a great deal of good. I know that in one or two cases last year, by just talking to some of the men who came into the Institute and picked out one fellow perhaps who seemed to be somewhat of a leader, and getting half a dozen or a dozen more around him, it seemed to form some kind of a little bit of an organization, you might say, that I believe are going to do good work next year, and I am going to watch those places very carefully, and I believe that is one of the ways in which we are going to stimulate the attendance, by getting the local people interested. Most of the localities have telephones and it does not take very long for a man to get on the telephone and call up a few of his neighbors and tell them, "We are going to have an Institute to-day and to-morrow."

There is another suggestion I want to make, and that is in a few counties, a few sections, possibly, the meetings are being held at one place a little longer than seems to be practical. Now I know that conditions alter cases. There are a great many places I know of in the State of Pennsylvania where, by going back to the same place, you can have a better Institute than anywhere else in the county; but there are a few places where that is not true, and I had a little bit of that trouble last season.

Another thing that did a great deal of good in Section 1 last year was the exhibit. I have never been on any section where we had as many exhibits as in my section last year. I know that means a lot of work and I do not blame any county chairman for not trying to get together exhibits, but where you have a local committee that will do it, I believe it should be encouraged. I know that practically all the newspaper men that are traveling with the Institute men will give as prizes a one year or two year subscription, and I believe that most of the newspapers will do the same, and offer an inducement for farmers to bring in a few of their things as exhibits and certainly that will add a great deal to the Institute. As I said, I do not wish to offer anything in the form of criticism, but merely these suggestions that have come to me during the year's work and which I have given to you for what they are worth.

The CHAIRMAN: The next section leader on the list is Mr. D. H. Watts, of Kerrmoor, Pa.

MR. WATTS: Mr. Chairman, Ladies and Gentlemen, Co-workers: I feel a little bit backward in speaking from the standpoint and poise as it were, of an Institute leader. I would rather be considered by those whom I face and know so well as a co-worker everytime. Now in my experience in Institute work, which began in New York State something like eleven or twelve years ago, I did not feel like imposing upon my home domain by beginning here in Pennsylvania, so I went to New York State. I knew some of the things that would likely happen to me and then I came back to Pennsylvania and through the mercy of my good friend, Mr. Martin over here, the former Director of Institutes, I was given a little work in Pennsylvania, two weeks, I believe if I remember correctly, and during that little experience as an Institute worker, my first experience as I have related, I felt just a little bit backward and bashful. I think Mr. Martin will back those words up; I felt that I did not get the encouragement sometimes from the section leader, section second man, as we called him then, that I should have had, because it was a great tribulation, a great trial. I never did any public speaking previous to that time, not one bit, and the cheer of a good county chairman once in a while I tell you did me a lot of good. Some of those men are not present here to-day; some have gone beyond the river, so I speak with a good deal of mercy toward a lot of our men; but nevertheless in this business the Institute field grows larger and larger and the County Chairmen have great work to do and they must not be asleep on the job—no not one.

You know I have a little faint recollection of something that happened to a minister's son in a little village in my neighborhood years ago when I was a boy of the same size and years as that boy. The boy's father sent him to the backyard of the parsonage to gather potato bugs and the boy did not like work very well, like lots of other boys, and he slipped around the house and crawled up on the portico roof and there presently, under the influence of the songs of the birds and the warm summer breeze, he fell asleep and after a while, naturally he rolled off the portico roof and struck the ground and got a jar that waked him up. He had been shunning his duties. While there was nothing serious happened to the boy, it was a good thing for him, it revealed his position and his father took care of him for a little while with a green branch from the orchard. I say to you that men sometimes with these duties fall asleep. I was in an Institute one time in Central Pennsylvania when the section was conducted and watched over by my good friend Prof. Menges; one of the men who was comparatively a new worker fell asleep so easy that he did not have that trouble and feeling that I had, and he sat there while I made a feeble address and Prof. Menges made a better one, and the room was very uncomfortable, and just as we were going out, this other man was introduced. He was like the boy on the porch, he had gone to sleep, he was not thinking about his mission or his message either. He got on his feet and began: "First," he said, "I do not know what I am to speak about, I am a little lost, I don't know just what I was to do," and Prof. Menges said, "My goodness alive, what in the world will we do with that fellow?" Well, somebody else took care of him; he had the jar that the boy got when he came off the portico; so we all have something to do, we must not forget the message and the mission. I do not; I still have that backward feeling about me; I think it is a pretty good thing after all. I had it as a boy going to school; the first time I ever appeared on my feet in the school room, I appeared there as a little tot and how I trembled and shook, and when I went to my seat I said to the teacher, "Don't you think it is awful hot in here? Hadn't we better raise a window?" It was awful hot for me but nobody else noticed it.

This Institute work, as we go backwards, is like a midnight dream; we cannot think of things as they have happened. Much of my Institute work is pleasant, most of it; sometimes when I go to a place where we are going to hold an Institute, it don't look very good; I can see a frown on the faces of some of the people, maybe the County Chairman, but usually by the time we go, we lock the door of the hall or church with a good feeling permeating the air. Usually that is my experience; whether it is taffy, a bouquet, or what it is, I don't know; I am glad they have that much respect for those men who travel with me and myself.

Then again we have some experiences that are not very pleasant. In one such instance in the last season we were entertained and taken care of at a hotel that was not very good. I think it was the only one in the town, but we had better be taken to private houses in such a case. I believe the man is not here this morning, I only wish he was, because I do not wish to say anything harmful about that Chairman; I think it was innocence, but we went away from that hotel—Mr. Wittman was one of the men and Mr. McCallum said to me a week afterwards, walking along the lawn of a good suburban home where we were being taken care of in a nice way, "Do you know, Watts, I can smell that hotel on my clothes yet." I forgot a lot of these things that happened this winter, but it was a way along in April this spring that I was cleaning out a calf stable and this odor came back to me again. (Laughter).

And then there come times when we get into these splendid places and that divides up and blends the sweet with the bitter and we don't have much to say about those things. Sometimes we have a team sent out to meet us at the station or to take us back, and we have to drive through the villages of the neighborhood and that team is not just what it ought to be, but looks like the team of the unthrifty farmer, some very careless fellow, and you may smell that team and equipment on your clothing afterwards. That is not a very good thing. Occasionally that has happened, when my fellow workers would say, "Well, you know Watts it is not a very good thing to have our bunch representing the Institute in a noble work like this carried in a conveyance that looks like this, because people sort of measure us by these things." There is a certain pride and dignity that every farmer does have and should have in his own conveyances around home, the way he goes to church and goes out to market and all that, and that should be the measure, to some extent, of how we go about from place to place.

I have said some things that are a little disagreeable in regard to the County Chairman's duty, and I can say as much about the Institute force and how those men do not come up to the scratch sometimes. I may be one, but I have not time to talk about that. I know we are to be brief this morning.

There are many things that come to me that I think would be an improvement in this work and we should just jot them down. That local advertising mentioned by my friend Funk is very, very important. I often think I would like to be the local chairman of Institutes in my own county or my own neighborhood. I believe the man should be chairman that can do the most good, after all—you have them here in this room—who can do a greater work and better work than any lecturer. We do not want to have chairmen or speakers either that do not pull up to the mark, if possible. It reminds me of a man the other day who came to a farmer, and he is a roadmaster, who ought to be a big man, and he came to a farmer and said, "Look here, I want you to observe Good Roads Day; boost it all you possibly can. Do you know when it is friend?" The farmer said "Yes, the 25th day of May." I am glad the Governor named that day; that is one of the greatest days in the year to me. Away back in 1861 there was a great event happened at my father's home on May 25th, 1861. If it were not for some of these mischievious boys, I would tell them what it was. My father was proud of it, though I don't think he would be to-day if he were living. "Well, now don't you know that's Good Roads Day?" It was the first time the Roadmaster ever knew it was Good Roads Day, but he boosted it for all he was worth, and his road machine allotted to his part of the township work was standing at the cross roads where it had been standing for nine months, not a bolt fixed, not even oiled, not used, and the roads of his portion of the township have never been touched except for a little work with a pick or shovel or mattock all this spring, and yet he wanted to boost something else outside of his field. Every man ought to stick to his last and do his part. That good roads business ought to have been threshed out yesterday more than it was; it sandwiches into all this work and these duties we have to do.

Now, fellow farmers, I for one am ready to step down and out of this work whenever the officials of the department find a man that will do the work better and more effectively than I do, I am only too glad to quit. I like to see the work go on because it is the one and only work in which I am greatly interested, save those social conditions that are so closely linked with it. I thank you. (Applause).

The CHAIRMAN: The next section leader on the list is Mr. E. B. Dorsett, of Mansfield, Pa. I presume Mr. Dorsett does not care very much what you may call him and I think you all will agree with me that you will have no trouble in hearing him.

MR. DORSETT: Mr. Chairman, Ladies and Gentlemen: Some years ago a noted philosopher said that when a man is satisfied with himself, his politics or his religion, he is dying at the top and had better send for an undertaker. I am sure that we who have been in this work for a number of years are proud of the record that has been achieved. I am also sure that none of us feel that we have yet reached the top, and I was pleased to hear the Director say that it would be his earnest desire to raise the plane a little higher, and I believe that every County Chairman and every Institute worker here this morning will say "Amen" to that.

There have been many questions raised and most of them yea, all of them, I am in hearty accord with; and I am not going this morning to raise so many. But I want to suggest a few relative to the Institute work. Something has been said relative to the advertising. I have had in mind some changes relative to the method of bringing the Institute before the people. If we had in every county as wide-awake editors as they have in good old York and Lehigh the question of advertising would not be serious. When the editors of those papers take interest enough in our work to follow us from place to place and write up the proceedings of the meetings and give us, not a half column, but sometimes a whole page or two pages, it shows that they are interested in our work; but oftentimes we go into counties or into villages where papers are published as weekly papers and they seem to know nothing about the Institute.

Now there must be trouble somewhere. We must reach the press and make use of the press if we hope to get our meetings thoroughly advertised and I have this thought in mind. All of you are familiar with the various lecture bureaus, sometimes called lyceums and Chautauqua bureaus, their methods of advertising. The pictures of the men who are to appear on the platform, in the windows, and in the press will be a sketch of their lives and with that perhaps a sketch of the subjects they are to discuss. Well, now, I see no reason why we could not follow that plan or why we might not improve upon it. What is the reason that the Institute workers cannot work out an outline of the topics that they are to discuss and send that in advance to the County Chairman or to the local chairman appointed by the Chairman, and see that that gets into the papers, one or two or three weeks before the Institute is to be held? In that way we will have the meeting brought directly to the people.

Then, again, I am in favor of more letters, more postals than are at present being used. The fact is that the poster that is put up and sometimes not very many of them are put up, I think have become too common. Some of them perhaps hang there from one year to the next and people do not know whether it is this year or last year that the Institute is going to be held, and some of them don't take the trouble to read it.

Then, again, a suggestion has been made relative to the topics discussed. I am quite sure that we can make some improvement along that line; that one thought is this, that we should try, as we have in the past—it is not an easy task—that we should try to see that men are sent to counties who are familiar not only with farm conditions but with the line of agriculture that is followed in that county. If we could do that every time there would not be much trouble. I think there is one chairman present here this morning—I don't see him now, but that don't matter, a year ago, two years ago, I was in a county and I was assigned a dairy topic, and we did not have very many men at the meeting that morning, just a handful sat there in front of me, and I asked the question, "How many farmers present this morning are keeping cows?" And just one hand was raised, and I asked him how many, and he said one. (Laughter). Now can anyone of you conceive how a speaker, even if he had the gift of W. J. Bryan, could talk dairying to a bunch of farmers and only one cow kept by the whole bunch? (Laughter). Now we cannot always correct that, but we want to, so far as we can.

Then, again, I am not going to say very much about the County Chairman; in fact I think I will let the other fellows lick you. I will keep a little closer to my own line of work and to my coworkers, because I know we are not perfect. I know that this last season there were some interruptions came to my work that were to say the least, disappointing to me, and I was sorry that they came,-but it could not be helped, and I think that is true with every worker and it is sometimes true with the County Chairman, but this sort I had in mind. Oftentimes we who are in this work follow the line of least resistance. It is so easy oftentimes for us to get a line of thought worked out and then we must get rid of that at each session and we do not take the time nor the trouble to ascertain whether or not we might change that a little for that particular occasion and do better work. Why, I remember in one instance a year ago, two years ago, I think, the County Chairman is here now, I was assigned a certain topic, had been discussing it the whole week, and that particular time we had an entirely different audience and I took in the situation and I did my best to give them a little different line of thought, and when I was through, the County Chairman came to me and said, "Why, that talk wasn't anything like you have been giving at the other places." Well, don't you know the secret of it all? We must do what the preachers do occasionally, take a new text and if we do not take a new text, why then, change the subject matter, at least. And so, in that work, I feel that the lecturer ought to have some knowledge of the people that he is to address. Now you can often tell that by looking at the audience. Sometimes I get fooled, just as friend Watts said, but if you get into the spirit of it you can easily tell. I like to watch the faces of the people I talk to and I can tell very quickly whether I struck the right keynote or not, and if I find I have not, I shift the sails a little bit and then watch and usually you can tell, you will catch some good old Methodist brother shaking his head in approval or disapproval and then you know whether you are right or wrong. Now that can come only by careful observation.

Then, again, I would like to say at the evening session particularly where we have two, I fear sometimes that we lose a golden opportunity at those evening sessions to impress upon the people this thought, that it is "not all of life to live, nor all of death to die." I fear many times that at the evening session we ought to get away at least a little from the thought of producing better crops and better livestock, and turn our attention more to that higher theme, the home. I fear sometimes that in those evening sessions we lose sight of that. I know that sometimes the farmers are busy during the day and they feel that they cannot come, and so at the evening session sometimes they are disappointed if we do not stick to the purely farm topics. But I believe that if the evening session is to be an educational session, we ought to have the pupils in the schools at that evening session and particularly when we get up, as we often do in rural districts—one county last winter, I recall that there were three schools within easy reach of one meeting place, and one of the teachers came to me at the first evening session and she said, "I would like to bring my pupils to-morrow, but the Directors object." I said, "Well, you bring them to-morrow and you tell the Directors to come to me and I will settle the bill if there is any to pay." And she brought them next day and no bill has been presented yet. I think that when a Director is so narrow that he won't allow the school children to come into an Institute it is time that he was dismissed from office. We must have the children at least at one session of the Institute if we hope to reach the coming generation.

Now these are some thoughts that I want to leave with you relative to the Institute work. Let us see if we cannot carry out the request of the Director and make the coming year the best year in the history of the State. (Applause).

The CHAIRMAN: Mr. W. M. Patton, of Mosgrove, Pa., is next on the program.

MR. PATTON: Mr. Chairman, Ladies and Gentlemen: I am hustling with a measure of activity as I like to do normally by reason of the fact that your Chairman has said to me that these talks are to be confined to ten minutes. Now to you good county chairmen, in regard to this work I want to offer no word of condemnation so far as my association with you has gone over this Commonwealth from one end to the other. In every county in this State have I found you men of worth, pleasant and agreeable, and those of you who are here this morning, in whose counties I have been, I can speak of you without a blush of shame upon my face because of our personal association. I never had a wrangle with one of you. Your troubles are your own troubles, and I want to speak to you of our troubles.

Firs, I think for the best, possibly for the betterment of those Institutes, one thing that I am most apt to overlook, in a large sense, is the fact, as some good brother here has stated, that the conditions are so dissimilar in many of the counties as compared with others. It happened to be my misfortune during the past season—I want to change that and say my good fortune, to cover the entire northern tier of counties in this Commonwealth, together with a section of the intermediate counties, and when you get up into Warren, Potter, Tioga, Bradford and those counties of magnificent distances, where they have practically no trolley lines and the snows get deep, the conditions are materially different from what they are in the good old county of York. But that is not the vital question; I would rather have seventeen good, honest, earnest, frank, candid faced farmers in front of me, deeply interested in the subject I am going to discuss than I would five hundred fellows half of whom have no interest whatever in the subject under discussion and come with no intent of carrying away that which I hope to bring them.

Then, again, I like to see farmers of this Commonwealth bring their wives with them to the meetings, if possible. You men as well as myself have attended agricultural gatherings and meetings of a similar character to those we had attended on prior occasions, and we believe there was a sameness about them, and do you know that to-day the women in the home are the chief thinking power, and when that good life companion sits at your side and hears subjects brought out which you have overlooked and when you go home and prepare to retire, or even after you have retired, she says, "There is a subject that occurred to me to-night in a different form from what I had viewed it;" you are going to be more influenced by the opinion of that wife than the opinion of your fellow-farmers, and your wife, if anybody, will call your attention to these things.

Now, another thing, do we, as Institute Lecturers, believe what we are saying? If we do not, we ought to be at home and stay there. Do we as Institute Lecturers know when we have gotten into the confidence of our audiences and are bringing them something in which we are interested? If we do not, we ought to go home and stay there. In harmony with my good friend Dorsett, to me there is no more interesting experience in the world than to look into the eyes of an audience and into the faces of those with whom I talk and glean there, in clearly spoken language, the fact whether they are interested or not. The truth is that in many instances subjects possibly are discussed in certain localities that never should be discussed; but we want to make it our business, my co-workers in this work, to bring a message to the people that is worth while, to believe in that message, to present it in such commonplace, simple language that they can carry away any thought we have and be open and subject to all the inquiries that may be made and ready to give a definite answer, if we can, and not be ashamed if we cannot, to acknowledge the fact. I was in a county, the Chairman of which is present this morning, a couple of years ago, when at a certain session during the morning there were 57 inquiries in the box. I have been in other counties in this Commonwealth where a meeting would go forward with such coldness that there wouldn't be a single request at the end of a session or at any other period. We should, in my estimation, find our way into the confidence of the people, into their respect and to that extent that they will believe and know indeed and in truth that we have something worth while, and they will come hungering and thirsting the days succeeding the first after more of the same kind of knowledge and information that was given them the day preceding.

One other suggestion and then I am through. I believe it is our business to work in harmony with all the organized forces along these agricultural lines of the State. I know there seems to be an unfortunate spirit, there seems to be here and there a sort of disposition on the part of certain organizations to practice a certain aloofness that I think should be eliminated in all detail and completeness.

The CHAIRMAN: We will next hear from Mr. J. T. Campbell, of Hartstown.

MR. CAMPBELL: Mr. Chairman and Friends: I have no speech this morning and I am mighty glad of it. The fact of the matter is, I am trying to get out of the habit of making speeches as much as possible. I think I have pretty nearly gotten out of the way of it, but there are a few things I want to say, and I want to say them because I believe in them.

If I may speak from about 16 or 17 years of experience in institute work, which covers the period in which I have been, to a greater or less extent, engaged in this work, speaking from the past season's work, there never was a time in the State of Pennsylvania, in the history of the agriculture of the State, when they needed the work of the Farmers' Institute as much as we need it right now, notwithstanding the fact that there are some, a few possibly, who would take issue with me and differ with that statement. We need them for more than one reason. We need them first, because the world is growing smaller, and perhaps that covers all of our reasons. The world is growing smaller because, with every year and every age, every kindred, nation and tongue that dwells upon the face of the whole earth is being brought closer together by more rapid means of transportation, better facilities for communication, and the problem that yesterday was a problem of a local community probably to-morrow is a world problem, and what affected us not at all in our community a few years ago has become the concern not simply of some remote section of the earth but is our problem to-day. And as I see it, we need the Institutes primarily for that reason, and I want you to think it out because it goes back a good ways and I haven't time to discuss it this morning. I like to look at some of the things that are more fundamental, some of the things that are lying around on the surface altogether, and I have been inclined to look at some of these things in a larger way, during the last year particularly.

Then we need the Farmers' Institutes again because of the fact that the Institute work, as I see it, must become the great open forum of agriculture, for every man that chooses to do so has a place and an opportunity to present his view and his side of the problems that concern the great fundamental industry of the earth, and the Institute's place to-day seems to offer the only opportunity along that line that seems to be open at the present time. A man, whether he expresses that in terms in which you agree with him or not, all the better if he does not, because he presents the side of the subject you have not thought about before, and no doubt you should know something about and think about, and I have come to admire and respect and I like to seek the friendship of the man that don't agree with me; he is the man that does me some good; so we need the Institute for some of these reasons, and during the last year or two in particular, I have learned to turn the searchlight upon myself and if any man goes to sleep in my audience, I want you to come around with a club and wake me up—I'm the man.

During the past year in Institute work, I have tried, made a hard effort, a strong effort, to present some of the larger problems of agriculture, because I feel that the time is at hand when we cannot afford to spend altogether all of our time discussing the things that concern us, getting another dollar out of our farm, however important that may be. The farmer of to-day must be in touch with the great world outside, he must know something of the larger agricultural problems that concern us to-day, and the Institute worker must present something of the larger problems of agriculture, and that means that the man who is going to do that work must be in touch with those problems himself, must have some convictions along those lines and be able to present them, and with that end in view and that thought in mind during the past year, I have made an effort with some of you Chairmen in the counties in which I was called; and unless I miss my guess with the Director, I should not wonder at that, because I undertook some of these things and some people differed from me. I have no doubt you heard from them up at your office. I hope you did, because, as I say, I respect the man that does not always agree with me, I love to have him present his side of the case. Sometimes it is necessary to stir a man up and stir up the red blood in his veins before you can make him think. With that idea in view I have tried, in my humble way, to present some of those questions along that line and I offer this now, not as an apology, because I do not offer apologies, but as an explanation of the fact that some of the work I undertook last winter which some of you people perhaps did not altogether agree with, I had an object in it and a mission to accomplish in doing it.

Then, again, in relation to this work, I am not going to stand up here and criticise, at any great length, the work of the Institute or those who have given of their time toward contributing to the success of these meetings, because I know the difficulties we sometimes work under, and I know that there always will be difficulties that have to be met at the time they come up, and much will depend upon the tact and the skill and the ability of the man that has them in hand to do the very best he can at that particular time. So these are a few suggestions, though, in a practical way, that I think sometimes would possibly be of benefit and contribute to the success of the meeting, and I think that possibly some of you, though I know not all of you, will bear me out in the statement I am going to make. I am not going to recommend it, but I am going to offer it simply as a suggestion.

I have sometimes thought it would be for the good, eventually, of the Institute, if every community that receives the benefit of the Farmers' Institute in the State of Pennsylvania, it were required of that community that they should furnish a comfortable building without any expense whatever to the State of Pennsylvania, and if that community has not enough energy, enough interest in the work and in their own good and what is undertaken to be accomplished along that line, the chances are that the interest is not sufficient in that community to warrant taking an Institute to it. Now that may hit some communities; but there are some communities in the State of Pennsylvania that it seems to me that all their object in getting the Farmers' Institute was because they had a chance to rent a hall for a few dollars to the State of Pennsylvania, and because possibly the men that were doing the work would come to the hotel and pay an advanced price over the regular rates for a couple of days and they would get that much out of the State, and that was perhaps the extent of their interest in the Institute. If we had a regulation of that kind, that sort of work would be cut out. I am not mentioning any particular places; I know that occurs in a few places in most every section I have been in.

Then, again, in the work and the men that are engaged in the work, I like that suggestion of Brother Watts, who gave a little bit of personal history, personal testimony along that line. I am going to do the same thing, because he called to my mind the man at the head of the work, the section leader. I wonder sometimes if he is not the man possibly who is making a hard effort to do his very best and has it within himself, with some training and experience, to make a successful worker, if he gets the encouragement sometimes that he ought to get from those who have had a greater experience. I say I wonder sometimes if we fellows have not been just a little bit careless along that line. And I think that there are those here to-day who could bear testimony to that fact if they were disposed to do it; and so I have tried, within the last few years, having learned the lesson myself as Brother Watts has, in the school of experience, to be just a little bit careful along that line, and I think it pays, and I know that what little I have accomplished, if I have accomplished anything in Institute work, I owe to the encouragement, the uplift and the friendly hand extended to me by a few of the older workers whom I see sitting before me this morning. But I am not here to pay tribute to what they did along that line for me and I hope to try, to my very best, to extend that help to others as I go along.

There is one thing about it, some people get the idea that we fellows around in the Institutes are getting a whole lot of money and having an easy time and that is about the end of it. It may be easy for some people, but it has not been easy for me by a whole lot; as far as the dollars are concerned, if it was only the money I was getting out of it, you wouldn't find me in it for a minute. I told the folks at home it has got to come to an end. But there is another side of the work, an opportunity that you realize, and the experience and education and training, along with the possibility of extending a helping hand to a needy brother, that is worth while considering and after all gives the work the attraction it has for me. I tell you my friends, today the man that goes out, there never was a time in the history of this world, you may take it in the forum, on the platform, in the pulpit, or anywhere else, there never was a time in the history of the world when the man that had a message got the hearing he gets to-day, and if a man hasn't got learning, he may express that message in laying brick or carrying mortar or in the pulpit or on the platform, and if he hasn't got a hearing, he may take his cue from it that he has no message every time, and so that is a point that is well worth thinking about. I tell you we need the Institute work to-day as never before, because there has been accumulated during the past few years, a wonderful amount of accurate agricultural information that is in a condition, we might say—that is not the word, but in the abstract, perhaps, that we farmers cannot and do not make use of because it has never been translated into the language of the farm.

And you may say what you please, my friends, the language of the farm to-day, always has been and always must be primarily a language of the heart; the farmer understands that language and the man who goes out without it, it matters not what he may know in the line of scientific fact or accurate information, he goes out without the ability to put that language into the heart language of the farmers so that it gets under his coat and gets into his confidence, and you will never accomplish what you should. I have seen a man come into Institute work and he hadn't much scientific information, but because he understood the language of the farm and could put his language in harmony with that of the farm, I have seen men crowd around him, he got the farmers' confidence; and I have seen men who had scientific information go out and they couldn't get in the farmer's heart and what they said fell in stony places because they couldn't accomplish it.

Let us not forget that fact, and I say to-day that we need the Farmers' Institute work because we have got that information and the man that can go out and put it in the farmer's language is the man who must do the work. That man must have lived his message, he must have worked out and been in perfect sympathy with the farmer by having lived upon the farm and worked upon the farm and come in contact with farm problems as well as the other side of it, and I say there is a great need of that in the agriculture of Pennsylvania and other states. It is worth thinking about, because the tendency of the times is toward scientific agriculture. The scientific man has done a wonderful work, but the man also is doing a great work who is able to carry that out and touch the farmer's heart with it, so I am inclined to turn the searchlight upon myself.

I am not trying to altogether be exactly accurate, I cannot expect that in my work, but I have tried first and foremost and above everything else to get the respect and confidence, get into that man's heart and if I can get into the hearts of a few men, my work has not been in vain. Sometimes the man you expect the least of, you get the most from. I have in mind now a man in central Pennsylvania. I attended a meeting where the fat of the land—you don't eat of it like you do in the Lebanon Valley, by a whole lot, but there was in that audience a great, rugged, coarsely-dressed, crude-appearing man, overgrown and stoop-shouldered from the hard work he had passed through, and seen, and I know that we meet a lot of that kind of men, but this one man in particular, before I left that point I trod my way into that man's home, and that man by his own effort and the labor of his hands through years and years of close application, with a family of eight or nine school children, had practically paid for a farm in that rugged country and his heart is just as big as he is. If I never accomplish anything at that point except getting that man's confidence and respect, I will have accomplished something worth while in that particular Institute. The only opportunity I am wanting now is to get back and see that particular man again. I want to go.

So these are some things we need to think about and take into consideration. Those of us who have not seen all the sides of the agriculture of a great Commonwealth forget some things we have got to pay attention to, and I like to think again in this work that I am responsible for the work I accomplish very largely, not that the County Chairman is responsible for what I accomplish altogether, but I am responsible largely. I was in one of the ruggedest counties of Pennsylvania a while ago and when I came home a little girl wrote me a letter and enclosed a little card or slip of paper, and on that card were these words, an inspiration, "Love, laugh and live." (Applause).

The CHAIRMAN: We have with us one or two friends from whom we will be glad to hear, who expect to take a train about 12 o'clock. First, is the former Deputy Secretary of Agriculture and Director of Institutes, Mr. Martin, whose figure was so familiar to you all in former years. (Applause).

MR. MARTIN: Mr. Chairman, Friends and Fellow Workers: This to me has been an interesting meeting because, after years of experience in our effort to upbuild the work, I lean more heavily upon the man at home in the various counties of Pennsylvania than any other, in order that we may arrive at some definite conclusion as to the best methods to pursue in order to reach the great mass of farmers in Pennsylvania, and I attribute whatever of success may have been derived and may have occurred and accrued from these years of work, more to the members of the Board of Agriculture than any other one source. Now there is no flattery about that. It is, I found, necessary, and to my own good, to visit you at your homes, to learn of your surroundings, and it may not be only to get an inspiration for myself and my work, but impart to you some little inspiration to prosecute this work to the utmost extent.

And again, we have listened, we have been edified, we have been instructed and my worthy successor has no doubt gathered many points from listening to these men of experience, these men actually in the field, coming day by day in contact with the actual conditions that exist on the farms of Pennsylvania. I expect if life is continued in me, to witness before the next decade passes, such an advancement in this great, broad field of Farmers' Institutes and Farm Advisers and farmers schools under the Department of Agriculture as would astonish the most hopeful, and why? Because it is a work which, if carried on properly, is fitted to meet the conditions. Naturally so. What we need in my judgment in Pennsylvania are men of apt, actual and right knowledge and experience who have worked out the problems of agriculture so far as they are concerned, upon their farms and in their homes, and with that kind of an inspiration, meet the farmers of Pennsylvania at their various homes and in their places of meeting, armed and equipped with that kind of knowledge, and make the Farmers' Institute a development of a higher and a better agriculture.

It is not all the money we attain, my friends, but it is our knowledge and conception of a real home life, it is the strength of a community, a grand home life, it is not only the strength of that community, it is the strength of the State, it is the strength of the nation, and the occupation you here represent and in the interest of which you are called upon to meet, is one than which there is no more important in all the occupations and professions known to man. Do you appreciate it, my fellow farmers, at your homes? Do you appreciate the fact that you stand sponsors for the greatest work that has ever been commissioned to mankind? I trust you do, and as we return to our homes and I go to my home and my farm life, let me say to you that the work you have sustained me in for the last nearly two decades shall never be erased from my memory, neither shall your acquaintances, neither shall the memory of the kindness and the forbearance which you have sustained towards me during those years. I bid you adieu. (Applause).

The CHAIRMAN: We have another friend with us to-day whom I have known for more than a quarter of a century and whom, I am sure, you will all be glad to hear, Mr. T. D. Harman, one of the Editors and Publishers of the National Farmer and Stockman, of Pittsburgh. (Applause).

MR. HARMAN: Mr. Chairman, Ladies and Gentlemen: I feel that it is a crime for me to waste your time, but Ed. Carothers insisted on it and I have consented to say a word or two. I want to congratulate you on this meeting. I have attended meetings of this kind, not every year but for a number of years. I presume it is 35 years since I have been going to your annual meetings and as many of your Farmers' Institutes as I could get to. I have got to make a living, consequently I cannot go to all of them. I believe you have got a better institute here, a better meeting than I have seen for a long time. I remember 35 years ago, I believe it was, of a meeting at Butler of the State Board of Agriculture. Since then Mr. Martin, who just preceded me, asked me once to make an address at Huntingdon, Pa. I am not a speaker, I want you to understand that. To illustrate that, I will tell you a little circumstance: I was out in Ohio one time and they were short of speakers, so they came around to me and insisted that I take some man's place. Well, I got up and thought I did pretty well; I stumbled along and got through, but I started out by saying that I was not a speaker. After the meeting was over, an old farmer rushed through the crowd to shake hands with me. He said, "I want to meet you, you are the only man on that platform that told the truth." (Laughter and applause). "You said you couldn't make a speech, and I'll be damned if you can." (Laughter). There was an honest man; it did me good. I have not butted in very often since, if I can help it, and I do not intend to. I am interested in the topic under discussion; I presume that is what you wanted, Mr. Carothers. Mr. Carothers and I talked this over last night; he is a new man, you know, and he said, "What would you suggest along this line?" I said, "I would suggest that you go out and live with these fellows who are speaking and see how they live, and if they do not live right, don't let them talk." That was his suggestion too; he said, "That's what I want to do."

To illustrate that, I want to tell a little incident or circumstance. I am older in this game than I look. Over 30 years ago I was at the Columbus State Fair and a long, gangling boy came up to my office hunting me, and he said, "Are you Mr. Harman?" I said, "Yes." He said, "I want to talk to you." I am afraid to imitate his voice, afraid you will recognize him. He said, "I want to talk to you a little about getting into different work from what I am doing. I am running a farm down in the tall grass, in lower Ohio. I went through college; I studied—I was going to study for the law, and my father died and I had to go back and run the farm, and I feel that I am hiding my light under a bushel, if I have any light and I believe I have if I can develop it." "Well," I says, "what have you done?" I says, "What have you done to get into the limelight?" He says, "Nothing." I says, "Have you run the farm?" He says, "Yes." "How long?" "Four or five years." "Is it any better than it was when your father left it?" "Yes, I am making twice as much money as father did." I says, "What are you doing?" He says, "Well, I have improved that farm, I have improved it and I am making more money and it is getting better all the time." I says, "Can you write?" He says, "I don't know, I never tried." I meant write articles for publication. I said, "You go home and the first thing you do, write to me and tell me what improvements you have made and what your ideas are on improving that farm. I want to know whether you are going to amount to anything or not, and then I will tell you whether you can write or not." And he did so and he started in to write and he got into the limelight from time to time, but he did it on his merit alone, on his work. He started on that and has done it ever since. I have reference to Alva Agee, that everyone of us knows, possibly. (Applause). I tell people when I meet them with Agee that I discovered him. I wouldn't have given ten cents for that fellow when he walked up to me there, but I saw he was honest, earnest and sincere and I just took a chance on him and I want to tell you that I had to revise manuscript quite a good deal when Agee first started; he can revise mine now, and I am glad of it, but Agee started in that way and I do not believe he has a superior in the United States as an educator, and especially among farmers and farmers' institutes.

I am glad to see you discussing the matter of improving. I have another suggestion for the Secretary: I believe that if I was in his place and running the Farmers' Institutes of Pennsylvania, I would get something new for each speaker; I would get an alarm clock, and when a man was to speak 20 minutes, that clock would go off. (Laughter and applause). I would even go further, I would fix that alarm clock on a contraption, I don't know what to call it, that would fit on his shoulders with a great big shield up above, and whenever that clock went off that shield would drop down to his breast. What a relief that would be; I believe it would work. Will you try it? I am offering that in a serious way. I think they would come to see the alarm clock and watch for it to go off. I think a lot of audiences are killed in that way.

The matter of publicity—that struck me. I am in the publicity game. I want to tell you why you do not get as much of it as you might. The people that publish a paper to-day, not my kind but publishers of newspapers, do not publish anything unless it is news. I have been turned down a hundred times in the last couple of years with a little publicity I wanted to work off in Pittsburgh. I happened to be the head of a big organization there and I wanted to get all the publicity I could, and they would say, "There isn't a news item in it," and when I'd look it over, I could see there was not. Now you will go here and there and elsewhere and possibly say the same old thing, and the reporter that has to make a story out of that cannot do it because he would repeat himself or he would kill himself, that's all there is to it.

There is one item I want you speakers and those in charge to make a note of—it is absolutely right; I have that trouble a little in our work, but not so much. You take a newspaperman and he has got to know it is news or he will break his own neck in publishing it twice. I think your suggestion, Mr. Dorsett, in regard to that advertising in the way these Chautauquas, etc., do, the pictures, I think that is personal matter, I think you fellows are working to get your pictures in the window; I don't like that for a minute. (Laughter). I want to tell Mr. Carothers that if he does that, he will have to change his force. (Laughter and cries of sit down). It will kill the whole proposition. (Laughter). One thing I can say, gentlemen, for the speakers of the Farmers' Institute, they are not two-faced men. I want to illustrate that by a story of Sam Jones.

He preached for a preacher down in Georgia, wherever he lived, the preacher wanted him to come out and preach for him and he did, and the preacher was a very homely fellow and Jones got up after the preacher had introduced him in a flowery way, and said, "I want to congratulate you on having one of the best preachers in Georgia; he is one of the finest men I know, and one thing about him you can say always that he is not a two-faced man. God knows, if he had another one, he would wear it." (Laughter). Like the fellow said about his wife's mother; her name was Helen Summers, and he said she was just the same in the winter time. (Laughter and applause).

This seems to be a meeting for suggestions. I have often wondered why you don't get more local people at these meetings. I was going to ask how many of you would be here if you didn't have your fares paid, but I won't ask you to put your hands up; but the trouble is to interest the people to the extent of getting them to come out—that is what you want to do. I don't know how to do it. There have been a good many suggestions made here; I don't know how it can be worked out. I am just as much interested as anyone on earth in my own personal way, business way, to have the Institute successful, because when that is so, the farmers are going to be prosperous and everyone engaged along that line is going to be helped and I am ready to help in every way we can. The trouble with a paper like ours is that we cannot advertise a local institute because we go all over the country and have so many programs sent in that we cannot do it, because there may be 50 institutes held in the territory we cover, and you have to depend on your local newspapers, and when you go into a newspaper office and want to get a little space, you have got to give them something in the way of news. Some of you never thought of that, but it is a fact, I have learned it myself by being absolutely turned down a hundred times in the last year or two. I was trying to get something, and it is true all over the country. I appreciate the fact, ladies and gentlemen, that I have been able to meet you again. I have missed out on several occasions of this kind, but I hope to be around again and I thank you for your attention. (Applause).

The CHAIRMAN: Mr. Chester, of the Pennsylvania Farmer, is present and we will be glad to hear a few remarks from him:

MR. CHESTER: Mr. Chairman, I assure you they will be but very few. I was thinking during the days we have been meeting here, of the good old times in which I have met with you, with one exception, for, I think, twelve years, and I am overjoyed at the renewal of association. I do not find that any of you seem to look any older or appear any older or in any way different except that you are no doubt wiser, and I am sure better looking than you were years ago. These meetings have been, this especial meeting has been of unusual merit and interest. I am sure that each of you will have renewed purpose. They will have the effect, no doubt, of the revival meeting referred to by a minister who came into a community to assist the local minister in holding a revival and appeared to be very successful. A great deal of enthusiasm was aroused and as the visiting minister was making his final speech and offering the closing prayer, he referred to the old minister, who was a resident there, and no doubt had become somewhat aged and decrepit; he prayed that the minister of that charge, because of these meetings, might be "filled with fresh veal and new zigor." (Laughter). And I hope that these meetings will fill you with what the minister had in mind when he made the prayer. The old minister afterwards, remarking on it, said he didn't mind having plenty of fresh veal forced upon him. (Laughter).

Since I was with you, the heads of the organization have changed. I am pleased to see that the same interest is manifested by them; they are taking up the work and carrying it on and furthering it to the end as suggested. I felt a sort of personal pride in the appointment of the new Secretary of Agriculture, because we grew up in the same county, some six miles apart. I had been to Secretary Patton's farm when I found him with gum boots on up to the knees pitching manure into a manure cock, and I know he is interested in agriculture, and not only interested in it, but he knows something about it, so you may rest assured that you will have his hearty sympathy and support and direction in the work of the Department.

I have been interested in the suggestions made by the Institute workers for the improvement of the work. No doubt many of them have been made heretofore, and I hope that they will be carried into effect. The matter of publicity, local publicity, has been talked over and over at our round-ups for a number of years, but in some way or other I have not been able to see that it has been carried out. As I gathered it from my work, it was one, if not the most necessary thing, as a matter of improvement. I have been in localities, and so have every one of you, where the programs for the meetings of that community were not opened until the first session was called and the string cut, and then they were distributed to the few who were present. That kind of publicity is too meager, there must be a knowledge of what is going to occur, of the subject to be presented. There must be an enthusiasm worked up because if I am interested in poultry or in land drainage or liming or in raising alfalfa, I want to hear it, and if I don't know whether there is going to be anything there for me or not, naturally I haven't much enthusiasm for going. I want to impress upon the new officers and renew the impression upon you, to keep at it, that the great need is not only to increase the attendance—let that be the object—but to increase the spirit, to increase the interest, and hence to enhance the value of the Institute to the communities of Pennsylvania, and advertising helps to do that better than any other way I know of. Anything we can do in the State to help the Department of Agriculture in any of its lines and especially the Institute work, I assure you that the Pennsylvania Farmer stands always ready and willing to do, glad to do it. Now, I thank you for your attention and for this opportunity and hope never to lose my interest in the work of the Institutes of Pennsylvania. (Applause).

The CHAIRMAN: The Board of Agriculture was taken out last night and shown the new improvements at the fair grounds here which I understand have been on a very extensive scale and fill one of the greatest places in educating the people to vast ideas in agriculture and increases the interest in competition in the growing of crops, etc. We have with us at this time Mr. McDermott, Secretary of the Berks County Agricultural Association, from whom we will be glad to hear. (Applause).

MR. McDERMOTT: Mr. Chairman, Ladies and Gentlemen: As an entire stranger in your midst, I appreciate that applause. It reminds me of a little story of an Irishman who was walking along the road one day and saw a bull over in the field, and the animal was pawing and tearing up the ground and throwing the dirt in all directions, and the Irishman thought to himself, "What a jolly good thing it would be to go over the fence and take the bull by the horns and rub his nose in the ground," and the idea so amused him that he began to laugh and laughed until his sides ached, and he thought of the great time he would have. He jumped the fence and went to the bull and got hold of his horns and what the bull didn't do to him I couldn't tell you in hours. When he got outside the fence and looked over at the bull, he said, "Well, I'm glad I had my laugh first." I'm glad I got my applause first. You were out to the Berks county fair grounds yesterday and saw what a magnificent monument we have erected there to the interest and benefit of the farmers of this county, and since 1915, to the interest of the farmers of the whole State of Pennsylvania.

In 1915 the Legislature passed a bill which permitted us to pay premiums outside of Berks county and on all products that are produced and exhibited in the State of Pennsylvania. We have a tract of ground which contains 60 acres of land, and some one had said that God made the land for a Fair Ground, and then it took two Berks county Irishmen, Henessy and McDermott to discover it. (Laughter). We have it fenced with a wire fence. You ask why we did that; it is the easiest thing in the world to explain—because you can always see them on the outside when they are trying to get in. We have one of the finest race tracks in the United States; in fact, the only half mile of its kind in the United States. It is known as a Billings Track. I could not explain the features of that track to you in an hour, if I tried, because of the many good features, but one of the things about it is that the horse starts to turn and don't know he is turning. One of the great things of the track is that very fact, and he continues to go with unbroken speed.

We have three buildings out there that are seven hundred and forty feet in length. They are joined together; they cost $26,000.00; they are built of hollow tile, concrete and steel. They have on them slate roofs—not slate, but asbestos shingled roofs, the finest and most expensive that could be bought. Everything we have done, we have done and accomplished in the short period of ninety-four working days from the day the contract was let until the day our Fair was opened, and four days thereafter we had a total attendance of 57,592 paid admissions; something we have never heard of before in this district. We did this all in ninety-four working days, raised $98,000.00, and when our Fair closed, we owed no man a cent, everythink we have there is paid for in full; we increased our capital stock from $100,000.00 to $200,000.00 and have a campaign on to-day to raise $50,000.00 more, for which we want to put up some new buildings, a poultry building, an additional barn and an especial building for woman's work. These are the things we want to accomplish in Berks county before our Fair opens on the 12th of September of this year, and we are going to do it.

You talk about how to advertise Farmers' Institutes—come to Berks county and get the lesson of how they did things for the Fair and your question is solved. The reason you do not get the publicity for your Institutes is because you do not go out into the community and get your farmers interested in your Institute. You advertise two or three or four men to go into a community to lecture. Get the man at home to help go out and ask John Jones to be a vice-president; go out and take a lesson from Billy Sunday, organize a choir of 250 people, men and women, in the community, the farmer, the farmer's wife, his son and daughter, and ask them to meet and rehearse for two or three weeks before the Institute, and I will guarantee you that you won't get a building in Berks county or any other county in any community that will be large enough to hold the crowd.

And then you have got to have a Billy Sunday there to talk to them. The great trouble with your Institutes is that your Institute lecturer is the greatest advertisement you can have; get a man who is wrapt up in his work. I believe in the man who is earnest when he does things, and if he is really in earnest, he will get enough life, energy and action into everything that he does and says that the people who come and hear him will come and hear him again, and your alarm clocks won't be necessary; they will want him to talk for hours. You have got to get men who have things to say, men who have a message for the people, and he has got to know how to deliver his message.

I have been interested in Farmers' Institutes for four years; I have followed them, and I will say this to you I was raised on a farm, I lived on a farm for twenty-four years, and in the four years that I followed the Farmers' Institutes, I have learned more about farming than I ever knew during the 23 years I was on a farm. (Applause) I will say that you have got the right spirit and you are going about it in a certain way; but you have got to get the energy and action and the life, you have got to have the right kind of a man to send into each community. Don't think for a moment that you are talking to a farmer who is coming to an Institute who doesn't understand everything you are telling him; he has it and knows it, and the moment you make a mistake and talk too long and talk too much about nothing, that is the time he loses interest and won't come back again. Don't think for a moment that you can get up on a platform and, because an hour of time is assigned to you and the State of Pennsylvania pays you for it, you have got to talk and talk a lot of nonsense. Get down to the real solid facts, and as soon as you have told them the facts, give them something else to put life into it, that is the thing that counts. If I were at the head of the Agricultural Department of the State, I would organize a school and make every man come into my school and make him qualify before I would let him go out.

A Member: Learn him how to break off.

MR. McDERMOTT: Yes, sir, I would, I would train him and send him forth and make him a lecturer worthy of his hire.

Now I want to tell you this, because I feel this—the Berks County Fair is here at this moment, it is here in the interest of the farmers, it is here for their benefit, it is here for their reward, it is here because you have to tell the farmer how to produce. The Fair Association comes along and they pay him the reward. That's what he wants; we all want the reward, we all want to be worthy of our hire, and if you raise potatoes such as your farmers can't raise and bring them to the Fair and put them there on exhibition, they are an education, and the great trouble with the Fairs throughout the State of Pennsylvania to-day is that they are not sufficiently educational. Every Fair ought to be a lesson, a lesson from the time you enter the gates until you leave them. Every Department ought to be there to instruct, and that is what we are going to have in Reading in 1916. We believe that the good old Berks county Dutch people can come to the front and show the people of Pennsylvania that the men who live in the county, who are farmers, believe that they can just as well stand at the front as stand in any other place. We are proud of our people and proud of our Fair, don't forget that. I am sorry you were not all there yesterday. Oh I was primed and fixed and I lost a great opportunity to make a speech. (Laughter) I wanted to tell you something right there on the ground, and when I am wound up I can say it. Now I want you to know something about the Fair. I will tell you anything you want to know about it or any other Fair or affair. I contend that I know it all, and if you don't believe it, ask me. (Laughter).

A Member: Isn't it more a place of amusement than anything else?

MR. McDERMOTT: No, sir; a Fair that is built for amusements only loses its strength of character and down she goes, and out she goes.

A Member: She ought to.

MR. McDERMOTT: Are there any other questions? The midway is like the baseball field or the backyard of a schoolhouse; the boys go out and play between times; it is so with you and so with everybody else, and that is the trouble with the Farmers' Institutes, they are all work and no play. Make them a place for toil and make them a place for play. Give them the innocent amusements. We ask people to come out and criticize the manner in which the Berks County Fair is conducted, it is clean and pure from end to end. We have ministers who are members and stockholders and invite them all to come; we tell the District Attorney, the County Detective, the Judges and everybody else to come out and look us over and if there is anything there they don't want, out she goes. We have a capital of $200,000.00 and the stock is $10.00 a share. I don't want to sell you any, because there is only two thousand left and it is worth $12.33. We don't want to sell you any. Under the general incorporation act in Pennsylvania we are entitled to incorporate in a local county and can pay dividends. You men are all fair men or you wouldn't be here; every agricultural society aids in your election, you are all fair men, and I want you to go home with this message—I don't care for you to tell anything about Berks county, but I would like for you to get the message from Berks county and go home and do good in your own county. I say that a Fair properly conducted is a greater educator than any Farmers' Institute that was ever held.

Some of you would like to know something about Fairs, but you have difficulties at home. Now, the little Fair can be just as successful as the big Fair and can make as much money. The great trouble with your Fairs at home is this, you have been giving away tickets of admission for years, you have been giving your space for nothing and permitting everybody to come in and pat you on the shoulder and say, "Jones, you are a good fellow and I'd like to fetch my wife and family in," and you have been giving him tickets. You cannot exist that way and never will exist that way. When you give tickets away, give them to people in New York and Chicago and San Francisco and Baltimore and other places where you know they won't come, and then you can say that you have advertised it.

May 25, 1916: 1 P. M.

Hon. Charles E. Carothers in the Chair.

The CHAIRMAN: It has been suggested that we take the counties alphabetically. Adams county, Mr. Weidner.

MR. WEIDNER: I don't believe I have anything at this present time to say.

The CHAIRMAN: Well, we would like to hear from you now.

A Member: I believe that most of these members here should say a little something about the Institute work. You are the head, the Chairman of the Institutes in your county, and I should think you would have a few words to say.

The CHAIRMAN: Mr. Weidner, have you any matters to mention with reference to next year?

MR. WEIDNER: The Institutes held in Adams county are not as largely attended as in some of the other counties, but I believe as Mr. Phillips spoke this morning—we have attentive listeners. I think those who attend take an interest and are very much interested in what is being said and try to carry it out. We do not have a great many people come just for the name of the thing, but they come for information, and I think that we will have better attendance the coming winter; I hope we will. We happened to strike a very bad time, the roads were in a bad condition and it was snowing nearly every day when we had the Institutes in Adams county, so that the attendance was not what we expected.

The CHAIRMAN: Next, is Allegheny county, which is not represented. Next is Armstrong county; Mr. Blyholder has gone. Next is Beaver county, Mr. Dunlap.

MR. DUNLAP: Mr. Chairman: I am sorry to tell you that the people of Beaver county have not come up as they ought to, for two or three reasons: The first winter I had charge of the Institute, a blizzard struck us and it was 14 degrees below zero, right along all the time, and that interfered with us very much. Last year the grippe struck us and there was sickness in almost every family in each part of the county, and that interfered with us very much. But our folks are very much interested in their work and when conditions permit, they turn out very well. The only thing about our county is that they are too far scattered away from trolley lines, and we do not have meetings enough, that is, they are not divided enough to allow the people from the different sections to get there with their own conveyances, and we are very anxious that we should have more Farmers' Institutes than we have been having, but I am satisfied that when they can get there, they appreciate the instruction that they have received there. Our folks are alive to their work and they are always hunting information and they are always ready to ask questions. The instructors who have been there have always given good satisfaction.

The CHAIRMAN: Glad to hear it. Bedford county, Mr. Biddle; he is not here. Berks county, Mr. McGowan, not present. Blair county—absent. Bucks county, Mr. Wambold.

MR. WAMBOLD: I don't know that I have very much to say. I suppose this is the Chairmen's meeting. I have conducted an Institute for several years in Bucks county and I have no complaint to make about the lecturers you have sent to us. We make them behave while they are there and we have them satisfied because we feed them well. On the other hand, we sometimes have a little trouble with our local places that we hold in; there seems to be some misunderstanding by these local places in regard to the amount of money they get. It is often put up to me that the State pays $12.50 a day and they want $12.50. I say, "My good friend, my expenses come out of this," and I have been conducting for $100.00, 10 days of Institutes in one county and have made the path a little smoother for the County Chairman in regard to distributing those Institutes for them.

I believe that if every County Chairman in the State was willing to give twelve days instead of eight, the county would be much more benefited by it, and I am working for that end, and I do not believe in just selecting a certain place for holding an Institute; I believe in distributing them. I had quite a time until I could alternate these Institutes. For instance, take the upper end of Bucks county, two days Institutes out of the eight; I have managed so far to give the upper end four days and alternate that in four different places. That is getting into a section, taking the upper end, dividing that into two sections and alternating every year, so that it will be a new thing in the district every year, and also in the lower end, and I feel that while our attendance is not quite as large as some other counties boast, the lecturers who have been in the county I think will agree with me that the interest taken in the Institute in our county has been good.

I do not believe very much in the question blank; I believe in the questions being asked right on the floor when the thought is in the mind of the asker, and I try to impress that on our people. In the way of advertising, I never have any trouble to get our programs printed a week ahead of our Institutes in any of our local papers, and a description in the advertising matter. The only trouble I find in those large bills is that they will be hung up and some farm sale notice underneath; if we could have some sort of placard and post it in the windows, I believe it would be an improvement on that, and keep it right before the eye of the farmers that come to that store. I know that the merchants will be glad to have the placard in his window.

Another feature I have introduced in the Institutes in Bucks county which I feel has created a good sentiment amongst the farmers and has improved the conditions of the different things—we have had just a little corn exhibit. I find no trouble in getting into our local bank and saying, "I want $5.00." I don't ask them to give us $5.00, I say I want it. We are going to have a Corn Show for this Institute and we want to offer a few prizes. Last year, holding the Institute at Sellersville, I simply asked the banks there and they both said "sure" and some of the merchants said, "I'll give you a pair of gloves" and others said, "I'll give you a pair of something else," this or that, and the very day that we had the prizes awarded, I got a check for $10.00 from a man who formerly was from that locality and said, "You place it wherever you think best," and in all we had about $25.00 without any soliciting of the prizes, and the year before we had that kind of an exhibit and I must say that the exhibit of that corn has improved wonderfully on the year before. It brought about the selection of better seed. We had Mr. Campbell there one year to give us a talk on that line and called on the exhibitors to give us their experience, how they raised that prize corn, and in that way I think our community has benefited by it a whole lot. It cost the State nothing for that. I think if that was practiced in other counties—for instance, I am going to take up potatoes next year; I don't think it is well to take up the same thing every year and I don't think the Department has any objection to such things in our system. The lecture on that topic will be discussed during the session.

The CHAIRMAN: Mr. McGowan, of Berks county; you were out when your county was called.

MR. McGOWAN: Mr. Chairman: I don't want to appear critical at all, but I believe that if we have thoughts and don't express them properly, they'd better not have been expressed. I have been thinking about a suggestion I wanted to make in reference to the length of some of our lectures that we have to deal with. Brevity is the soul of wit, and I believe it would be better for the hearers at our Institutes if some of the lectures were shortened quite considerably. The alarm clock brought out that remark; and also the suggestion of Mr. Dorsett, that we should enter into the spirit of the Institute. Now I noticed at several of my Institutes that the audience is generally very critical along these lines, and what I say I say in all kindness, and that is the indifference upon the part of many of the speakers, unconsciously to themselves. For instance, the reading of periodicals in the presence of an audience on the part of the Institute speakers is an indication that they are not sufficiently interested in the success of the Institute, or the writing of many letters—which may be supplied for the reporters. I feel that if this must be done, it would be better for the success of the Institute that the gentlemen retire and read their papers, not in the rear of the room and not in the presence of the audience, but at the store or some other place so that it might not show the indifference that it does.

Now lengthy sermons spoil congregations; and as an illustration, this fact came to my mind just recently, only a few days back. I am connected with a church at which our minister was in the habit of preaching fifty minutes. He was away for a time and we thought if he returned we would kindly tell him about his lengthy sermons to save annoyance. Another man was sent there, gave us a sermon in twenty-three minutes, and I went to him and said, "I appreciated the discourse, first, from the fact that it was brief, and second from what you said." "Well," he said, "when I took my church, the minister had preached forty-five minutes. He wound up with empty benches. When I took the appointment, my sermons were from twenty to thirty minutes. I left to come here to you people with a full house." I heard a gentleman get up at State College and he said, "Well, folks, now I do not intend to tire you with a long discourse; I learned my lessons in brevity when I heard a certain theologian get up and say, 'If I can't make any converts in thirty minutes, my case is hopeless." So I really do believe, friends, that we can learn very much right along these lines.

We want co-operation for our local people, and with a more brief outline, right to the point on the part of the lecturers, we can get the co-operative thoughts of the hearers and blend them together with a great deal more profit than to consume too much time with a long discourse of fifty to sixty minutes. I have had lecturers come to me and say, "Well, McGowan, I can't possibly get through with this in less than fifty minutes," and we have three speakers, possibly. You see the length of that time; and I have found that to press them to anything short of that did not seem very agreeable. So this alarm clock suggestions prompted my making to you these suggestions, not in the way of criticism, but I believe it will work out a great deal better if we boil down things to the point. I was recently connected with a little campaign; every man was limited to ten minutes and I was wonderfully surprised at what a great amount of information could be given in the time of ten minutes. Mr. Chairman, I offer this in all kindness and I believe that we can do some good right along the line of brevity.

The CHAIRMAN: Mr. Louis Piollet, of Bradford county. Be as brief as you possibly can.

MR. PIOLLET. I understand that this session is for the Chairmen of the Farmers' Institutes to know their duties and what they are to do, not as we understand, but what the Department wants us to do. I have already received blanks for calling a meeting in June of the different Agricultural Societies and people interested in Farmers' Institutes, asking them to come to the Court House to select places to hold the Farmers' Institutes. We are to have four Institutes in Bradford county, two days each. The people are interested and want the Institutes. They have already spoken to me. They want one in Raysville, one at West Franklin, etc., but we are going to wait until June and let them come to the Court House and select them altogether, and we will select the places to hold those Institutes in different parts of the county that will accommodate the farmers best. I have had some experience in Farmers' Institute work, as I was a member of the Board a number of years ago, during the time of Mr. Edge, and I have hauled Brother Seeds, John Hamilton, old man Calder and Ex-Secretary Critchfield and many other men over our county to Farmers' Institutes. Now I suppose it is the duty of the Chairmen of Farmers' Institutes to take these men as they come to us, entertain them and deliver them to the place of meeting; that is what is expected of us, whether we should do it or not; and the $12.50 a day spoken of is used up before you know it.

Now some of the lecturers this morning spoke about the rigs, conveyances, that they were hauled in, that it was rather beneath their dignity to ride behind an old plug of a farm horse. Well we cannot all have the best rigs, but nowadays the automobiles are coming in and I believe they can be transported in automobiles, maybe. I was going to say that during the winter season at the time we have the Institutes, I have gone through snow drifts and taken blizzard weather to meet these men and carry them from one end of the county to the other, which could not be done in an automobile.

I believe it is the duty of the Chairman at a Farmers' Institute to make out the program for the different places that you have selected, to choose in that locality a subject committee and have a chairman among them, that they are to look after the things at that one Institute; and the Chairman of the county, it is his duty to be there and to conduct the meetings. I believe in making out a program that suits the people you are going to talk to, the people you want to reach in your county. In our county, Bradford, it is largely dairying, and we need a man who knows how to talk dairying. If it is a potato county, we need somebody who knows how to talk about potatoes. If it is poultry, we need somebody who knows how to talk about poultry. We have all those things in our county, but especially the dairy industry is what people want to know about. I am in favor of having two or three men from the State that you can choose and fill up the balance of the program with local talent. I believe that the evening sessions should be devoted to educational topics and to domestic economy, and that we should have one good lecturer to speak on that question say for three-quarters of an hour, then the rest of the evening to be filled up with entertainment by local talent, recitations, songs, etc., and in years gone by, when I worked at this thing, I never had any trouble to get a crowd and people were always ready to come out, and I believe that if every Chairman will do that, he will make a success.

The CHAIRMAN: Mr. Piollet, I think perhaps you misconstrued the remarks of the speaker with reference to its being beneath their dignity to ride in a buggy; I don't know who made that remark.

A Member: I would like to speak a word in behalf of the man who spoke. I think I was with the gentleman just at that time. He of course had in mind a particular trip we made, I think he referred to that I think I was with him on that trip. It was mountainous and we walked about a third of the way, and the reason we walked was because those two horses were too poor, too skinny to pull us. Now the speaker had that in mind, I am quite certain.

The CHAIRMAN: Well, perhaps we'd better thresh out a little further the duties of the Chairmen in looking after and going with the corps of lecturers. It seems to me, where it is absolutely necessary and important that they should attend each Institute in the different sections of the county, that they should not lay too much stress and put themselves to too much trouble to look after the transportation to and from these locations, of the lecturers. I would suggest, of course, that the proper way for them to do is to—

MR. PIOLLET: Take care of themselves?

The CHAIRMAN: Not be dependent entirely on the County Chairman, as they have too much to do, that they do not expect too much personal attention from the different places. The next county is Cameron. Mr. Heilman is not here. Next is Carbon; Mr. Leinhard is not here. Next is Centre; Col. Woodward has gone. The next is Chester, Mr. M. E. Conard has gone. Next is Clarion, Mr. J. H. Wilson.

MR. WILSON: I am from a county not known for the best roads in the country. We have no trolleys and it is sometimes a little difficult to move from one place to another. But I have always been pretty successful in getting a pretty good rig to take the lecturers and I look out for those rigs and hire them before the Institute comes, and in advertising the Institute, I order plenty of programs and mail one to most all the prominent farmers around where the Institutes are to be held, and I visit the merchant there and tell him we are going to have an Institute and give him some programs and we always have a pretty fair turn out in our county. And I must say that we never had a bad speaker; I will say that for the Department, we never had a bad one, never had one that didn't give satisfaction. And in making out the program for the Institute, I always visit with the local committee and have them to select the subjects that will most interest the people of their immediate neighborhood, and in that way our Institutes every year have been improving. I think our attendance has been much larger the last year than it was the year before, and the year before that it was larger than the previous year, and our people are more interested and I think the Institutes, as they are conducted now, are doing a great deal of good and the people of our county are satisfied.

The CHAIRMAN: Clearfield county—Mr. Way is not here. Columbia county—Mr. A. C. Creasy.

MR. CREASY: I haven't any report to make, as I am a new man in this work and I came here for the purpose of learning all I possibly can and I have received considerable information and for me to sit in and take the place of our former member, J. P. Young, I am afraid I will have to have that alarm clock started over me. He did successful work in our county and made the Institute a success. I will guarantee this—I will do all in my power to make the Institute a success in our county.

The CHAIRMAN: Crawford county, Mr. W. F. Throop.

MR. THROOP: Mr. Chairman, I have only been associated with this work a short time and have hardly any criticism to make. My troubles with the lecturers have been small, not to any great extent. They find fault with me, say I nearly freeze them to death. I believe our Director of Institutes had something to do with the weather at that time of the year. In part of our country, there is a large section that it is impossible to get to by rail or trolley and we have fifteen miles to drive. The time of the year when the Institutes come there is the worst weather we have. It has always been a question why the Institutes will start in the southern part of the State in good weather and work up to us in bad weather. In the northwestern part of the State, up until the middle of January, we have practically good weather; from then until the last of March, the weather you might say is something fierce. If they are going to continue the Institutes there in February and March, the only thing I would ask would be that you send me a lighter class of men to haul. We had considerable of a load last year; we only had one light one in the bunch. When you come to haul about a ton around, you must have a good team.

In regard to advertising, we have no trouble up there in advertising. It has been my practice in the two years I have been in, to take the Institutes to a part of the county where they have never been held. Whether they have been successful or not, I don't know. Our attendance last year I believe was 3,600 for eight days. I considered that that was very good for our county, and I question sometimes whether the idea of having some of these lecturers a part of them, coming back to the same county the next year—I credit the attendance in the two years past to the lecturers we have had. One incident: One man on the program was a horticulturist and I had the hardest time with that committee to have him on the program at all; they said, "We are fifteen miles inland, what do we want with fruit?" I believe after Mr. Fassett gave his talk, he was one of the most in demand of any of the speakers, and I believe it did a wonderful lot of good, making that whole trip over there fifteen miles through the storm.

The CHAIRMAN: Cumberland county, Mr. Ferguson.

MR. FERGUSON: I recognize that the problems differ with our counties. We have heard about the transportation of speakers; we have no trouble in that line. We can reach all our points by automobile, and also with regard to our hotels, we don't have to sprinkle the instructors with cologne after they have been to one of our hotels. When I became a manager, the Institutes were held in Carlisle, Mechanicsburg and Shippensburg. The result was that there was just a handful of men about the town that had nothing else to do, who attended. We took them out into the country.

In regard to advertising, we have no trouble along that line, the people come out. We get in touch with the school teachers and distribute programs in the school and we have the community enlisted in our interest. In regard to the long speeches—you notice my brother spoke about the sermon—I suppose that is true with the layman; it was first the brief sermon and then the good sermon, the short thing, whether it is good or not. We have tried to break up this speech making and have encouraged our men to interrogate the speakers, announcing at the beginning of the Institute that if they had a question, to break in at any time, and the speakers have encouraged that sort of thing and I think they will bear testimony that there are a good many farmers with the interrogation point in Cumberland county. You have no trouble with the length of the exercises, when you can have questions and give answers, because there are a good many farmers that know just as much about some of these practical things as the man who is giving the instruction, and it gives him an opportunity to confirm what has been said or to interrogate the speaker in regard to his reasons for the position that he holds.

And Mr. Director, it seems to me that the great problem that is before you, the great responsibility is in the selection of the men who go out to teach. I have been a school director for twenty years. I felt that the great obligation on me was to select the teachers. If you could get the right kind of a teacher, the problem of that school was fixed for that year, and that is true of the Institute work. If the Director can lay his hands on the right kind of teachers, why this problem of Farmers' Institutes is largely solved. I think it is the great work in agriculture today. There are a few of our boys getting to State College; there are a few of the men go up there to Farmers' Week; they are interested in State College; may more of them go and get the benefits that go out from that institution. But the great mass of men in the rural districts, the uplift that comes to them along agricultural lines comes from the Farmers' Institutes. And what we want, Mr. Chairman, is a larger appropriation. I could locate twice the number of institutes that will be given in Cumberland county, and that is what we want, and if we had more money we could make more places.

I want to say just what Brother McGowan has said in regard to the attitude of the speakers toward one another. For them to be disinterested, reading the newspaper or writing a letter or doing anything of that sort in a session the effect upon that audience is not good. They had better remain in their hotel, or at least when they are at the Institute, show an attitude of greater sympathy with the work. We Chairmen need sympathy to go around from session to session and hear the same talk and the same jokes, and for these men to spend two or three months in listening to the same thing day after day and night after night, I have a great deal of sympathy with them; but it seems to me that in order to press upon an audience the importance of that session of the Institute, every member there who represents the State should be an interested spectator, listening and seizing every opportunity he has to help along.

Just one word more, Mr. Chairman, and then I am done. I am glad of the opportunity to be associated with this work of the Farmers' Institutes, the men whom Mr. Martin had, through these years, selected out to do this work, men of knowledge and men of character and men of inspiration and uplift and a blessing to every community in which they go. And among the precious memories of the years that have gone by have been my associations with these men and I think we want men who are interested, not simply in agriculture but in rural conditions. We want to boost this work of agriculture at the Farmers' Institutes. (Applause).

The CHAIRMAN: Col. Woodward, of Centre county. I just call your attention, Colonel, to the fact that we are trying to hold them down to five minute speeches as near as possible.

COL. WOODWARD: You must somewhere have heard something of my reputation; they say I never made a five minute speech in my life and cannot do it.

The CHAIRMAN: Well, we will take a chance this time.

COL. WOODWARD: I apologize for being ignorant of the subject under discussion, as I just came in this moment and sat down. I infer from the few last remarks that I heard made, that the subject is the work of the Farmers' Institutes; Mr. Ferguson, what were you talking to or at or on?

MR. FERGUSON: The Farmers' Institute, from the standpoint of the County Chairman.

MR. PIOLLET: I thought you were a County Chairman.

COL. WOODWARD: I am. The point of view that the County Chairman gets of the Farmers' Institute is a quite different one from the view that any other man connected with the work does get. The itinerant speaker, of whom I had the special honor to be one for a great many years in this State and some other states, does not begin to get the view of the work that the man who is Johnny-on-the-spot does. He does not know the needs, as the local man does, of the Farmrs' Institute, and the Director who selects the speakers, does not know the needs and never will. Mr. Director, I am not discouraging. I do not mean to discourage and never will, as the man who is living in the district and sees the farmers from day to day and night to night, does know them. Now I wish I had heard my Brother Ferguson's remarks all through. I am pretty sure I should have agreed with all he said. I know that I agree with the final remarks he made, but the impression ofttimes comes to me that there is weariness among the farmers of the similarity of the work that comes to them through the speakers who come from year to year, and that there are occasions at least, speaking not of my own locality more particularly than some others of which I have knowledge, that sometimes they wish that there might be some change.

I have nothing to suggest; I know of nothing better than the course that has been pursued, but that impression has come to me possibly through the audiences with which I am most familiar, the localities with which I am most familiar in my own county. Sometimes in thinking it over, I have attributed the appearance of that thing in my own county to the fact that we are too highly favored by sitting under the drippings of the eaves of the great agricultural college. We see and know and hear in our county almost constantly of the teachings, of the work, of the doings and goings-on at the College, and becomes familiar with it, get an idea of it, a great many more of us, farmers' day and farmers' week and all the other occasions that happen there. We are proud of our Institutes, glad of our Institutes and are entertained by them; go to them very frequently and hear and know more of them possibly than those localities which are at greater distances, and this feeling that I have detected sometimes in our own audiences in Centre county was due to that fact, that we were familiar with the things that come to us through the Institute workers more perhaps than others who are further distant from the college and have less of that that is going on there. It has not occurred to me to suggest any improvement or any change; I don't know that I could suggest any. I have not thought it was worth while to undertake to suggest any.

The CHAIRMAN: Delaware, Elk, Erie, Fayette.

MR. WITTKORN: (Delaware county). Our county is largely becoming suburban, so we now have nothing but millionaires and suburban people and that makes the work of the Institute rather hard. We only have a small fringe adjoining Chester county, where we can hold meetings. There was one criticism called to my attention in the last few years, the apparent lack of courtesy between the speakers. I think that if they used the back part of the hall to read the newspapers instead of the front, it would possibly give the audience a better impression.

The CHAIRMAN: Fayette, Forest, Franklin, Fulton.

MR. RANCK: (Fulton county) Mr. Chairman: We are an agricultural county, no manufacturies, mines or railroads, and it is a very difficult county to get over with a Farmers' Institute. We have no way of travelling except by teams or automobiles, and automobiles are rather expensive over the kind of roads we have. But the interest in Institutes is gaining. Last year we had a fair attendance, but it was interfered with very much at one point by scarlet fever in the neighborhood. The other one was fairly well attended considering the bad weather. The interest is gaining, although we are under difficulties that perhaps no other county has to contend with, and that is the way of getting over the county. To come in at one end of the county and go out the other is about 40 miles. We have been having the best kind of lecturers sent to us and people appreciate them very much and the interest is gaining and I always want a continuation of it and I think our people will be much benefited by the Institute.

The CHAIRMAN: Greene, Huntingdon, Indiana, Jefferson—Mr. Cowan is here, I believe.

MR. COWAN: (Jefferson county). I have no criticisms to offer of the speakers who have been sent to our county, and I have made an effort ever since I have been County Chairman to take personal supervision of the entire work until last year when I was unable to do so or attend any of the meetings. I do not know whether that was the reason or not, but I have never received as many letters of encouragement from the people in the neighborhood where the Institutes were held as I did last year, while lying on my back in bed, sick and unable to read or even to write. A neighbor did what little writing was done and we kept him busy, and after the meetings were all over, I received a number of encouraging letters and inquiries trying not only to get the Institute there during the coming season, but to get the same speakers back, so they have not discouraged the people in the neighborhood. We will very likely take one of our next Institutes at one of the places where we held a meeting last winter; they had never had an Institute there before and were very much pleased with the speakers sent out, and one of the places where we had held an Institute before, they said they never had a better corps of speakers in the county than they had at that time, and I hope this work will continue.

So far as transportation is concerned, getting them from one point to another, we do not have it always flowery up in that country either. I see Brother Menges here and he was with me one time when we had to cut out some of the meetings, for instance up in Knoxdale, he was appointed there and we were way at the other end of the county. These meetings had been placed previous to my becoming Chairman and the Department at Harrisburg, with the assistance of the previous Chairman, seems to have no difficulty at all in finding places to place the Institutes, but it requires about 100 miles of travel to get around to those places; it took two teams from the delivery barn to keep the men moving and there wasn't much time to talk. Many other difficulties along these lines have become memories. We have no criticism to offer in regard to the Department or the speakers they send out.

The CHAIRMAN: Mr. Matthew Rodgers, of Juniata. Please be as brief as possible.

MR. RODGERS: I wish I was like Col. Woodward and could make a five minute speech; I can't talk that long. I am like Mr. Harman—never made a speech. I think, Mr. Chairman, that the whole thing, or a great deal of it, depends on the Institute Manager of the county. If he is a man that will get up and go to work and keep his people interested and informed of what is going on, he doesn't have very much trouble getting an audience. That is one of the difficulties we have—we get too much audience. I think I will have to quit advertising quite as much as I have been doing. Some of the speakers who were with us last year remember how we had trouble and the breaking down of the building; the crowd we had in was so great that we had to just open the aisle and keep officers in case a fire or anything would happen.

We advertise and we get ready; as the speaker over to the right, Mr. Wilson, said. We got lots of programs printed, put them in an envelope and mail them, not only to the substantial farmers but to the ones that are not substantial. We want to get the man that is not a good farmer out, if we can. The good farmers will come, but we want also to get the man out that is just learning how, and after we get the audience there, it depends on you, Mr. Chairman, and the

Department of Agriculture, to send us men who will keep the audience under control, give them something to think about, that have something to say. There is one place in Juniata county where they won't stand a long talk, they will put you off the platform themselves, and we don't want very much of it, we want you to boil down your talk. We have had a number of men that repeated and repeated and went on--it is the boys that do it generally--we try to make a short program, as is necessary; we do not want to load the program, and then we discuss the subjects. We have a long county and a very narrow one. You can stand on my farm and see both sides of the county, you cannot reach it though unless you have very long arms, but we have a 20 mile ride—if Mr. Scraggs was here, he could tell you, either a 20 or 30 mile ride, on a very cold day, no snow on the ground but an open wagon and the thermometer below zero. But we get the speakers there, and speakers who have been with us and were not satisfied with the treatment they got in our county, I want them to stand right up here and say so.

The CHAIRMAN: Next is Lackawanna county, Mr. Horace Seamans. We have a very important program for the remaining part of the afternoon; this co-operative market proposition, but we do want to give the Chairman of every county an opportunity to be heard.

MR. SEAMANS: Mr. Secretary and Mr. Director and County Workers: In Lackawanna county we have had Institutes and Institutes; sometimes interesting and sometimes I have thought otherwise, though I sometimes get the blues, and I suppose that when I get the blues, why perhaps I think that Institutes are not up to standard. But usually we are very fortunate in our speakers that we get in Lackawanna county. Last winter we were exceedingly fortunate and I think we had the best Institute there we have had in the last five years, so that after the Institute closed sometime I received a notice from the Department that I had got to get out and hustle for the Institute in the county, that it didn't seem to be up to the average, and it kind of hurt me across the stomach and I felt rather sore for several days but I think I will get over it. Now, in the northeastern part of Pennsylvania we have a good many mountains and a great deal of land that is waste land. It is not thickly settled; the land is not as nice as it is around Reading; and the inhabitants are not so thick and some have a long way to go to an Institute. This was why the attendance at our Institute last winter was very attentive and why I thought the Institutes were better, very much better than usual.

Now, to illustrate that: Two weeks ago yesterday I attended the Pomona Grange in Lackawanna county, on the Pocono Mountains. Twelve of us got in the automobile and started from the railroad station to go to that place six miles away. We got about half way there and the lady said to me, "That's a deer." A deer jumped out in the road. Where deers live the inhabitants are not apt to be very thickly settled. It is sparsely settled there and I was very much surprised when I got to the place to see only one house in sight of the Grange Hall and I thought there wouldn't be much of a meeting. But I was more surprised when we had our dinner and 120 sat down, showing that they come from other parts of the county that were more thickly settled and they were trying to help out, for the Grange was a new one.

Now what to say or what to offer in this work, I do not know. I am getting along to the time of life that I am satisfied with most anything, and I guess I will not criticise.

The CHAIRMAN: Lancaster county, Mr. Bruckart.

MR. BRUCKART: I must confess to being one of the younger County Chairmen; I am only two years old. I will say, though, that I had some experience before as a county institute speaker and I have observed some things and learned some things now by experience, and the way I understand it, the scope of this Institute work, the way it is put up by the Department. The object is to reach the greatest possible amount of farmers, benefit the greatest possible amount. In order to do that, we have got to try and get them into our meetings.

Now, when I took charge, I found fairly good Institutes in our county, but I started with that object in view and I have still got that object in view to fill the halls, especially in the daytime. The evening meetings generally can take care of themselves pretty well; we want to get the farmers there during the day. Now, it may interest you to hear how I started, because it was a success. We had two days less last year than the year before, but we had an increased attendance, and after I was appointed, I first made it a point to meet the different local committees that had been on duty in different parts of the county. I set a date and went to their places and met them, and when I came there I found local committees with lists, some of them a foot long, and when these men did not come, three or four or five came and met me and we made out a program of those men that had interest enough to come, and I used them for my live wires and then we revised this local committee list and found out there was a good deal of dead wood in there and trimmed that out. Men were on there who were in various callings of life and were not really farmers and did not even honor the meetings scarcely with their presence. We cut them out and got on a good live committee in each district where we had Farmers' Institutes and then appointed ladies on committees, called them the domestic science and needlework committees, and got them interested.

We should get the ladies in these Institutes, because if you get the ladies, the men must come, they will make them do it. And there is another reason why we want the ladies in, and that is this: Now these State lecturers, they are, as a general thing, good men, but do you know that, as a rule, they are great admirers of the fair sex, and if you get them in there at those meetings, it puts them on their mettle and they will do better work than if it is just a stag party; they will do a whole lot better work, they will get right down to hard tacks and show up to their best advantage. I hope you will make a note of that and whenever we have those ladies' committees, we have our best Institutes and so we have been working along that line.

And now about the posters—do you know I think that the poster has about ceased to work; it does not seem to bring results. I get in touch with our local papers and they give us these notices that the Department sends out, notices that I write out; and, by the way, I find this to be the case, I have got to do that work myself; if I leave it to the local chairman, it may or may not get done. I know that in one instance when I got down to the meeting the programs were lying there, had not been put out, so this last year I got all those programs and went to the local committee and helped them make up a program, took the copy home and had it printed, and about three weeks before the meetings came off, I took half a dozen of those programs, put them in an envelope and mailed them to each member of that local committee, distributed them all through the session and told them they should put them where they would do the most good, and that is a very good way of advertising your meetings, because the people will read this program, get it out and talk about it. They talk about it and get interested and get their neighbors interested and come to the meetings.

Now one word about these lecturers. I know the Department makes changes from time to time and uses the best material they have got. Last year we were unfortunate, one of the best speakers could not come and they wanted to be very kind to us and sent us three young men from State College, men that did not have any experience. I am a State College man, I have got a boy in school there now, but that was a little too much, it might do in some communities, but it did not do so well in our community because the Lancaster county Dutch like to have men who have had the practical experience and can come and give it out from their own experience. and if you can send us men that can talk Dutch or talk United States, that is the kind we want, men that can put it right there in a reasonably few words.

Now in regard to that time limit, about the speaker, putting the alarm clock on; you know that is difficult for this reason, a man may have a short speech and fall short. A man may have a subject that he cannot possibly handle in twenty minutes, he cannot do it, and so long as that meeting is interested and asks him questions, holds him up and gets information out of him, I do not like to pull down on him. Of course we have got to do it eventually, but I say we have got to make a little distinction, you have got to be elastic and not be too much to the point. Thank you.

MR. J. ALDUS HERR: Can I, as an ex-member from Lancaster county, give a few suggestions?

The CHAIRMAN: Certainly, we will give you two minutes, if possible.

MR. HERR: First, I would say shorten the program; don't have so many subjects, and when you have a good subject that you are interested in, finish it. Two subjects in half a day or one session are sufficient. Then again, send the man to the district who is familiar with the customs of the community. What right have I, as a farmer of Lancaster county, which grows tobacco and feeds fat cattle, to go to the northwestern part of the State and tell that man how to farm, when I know nothing about his business? (Applause). We have not had a solitary man except one professor from State College to tell us how to grow tobacco, and we have had about two men for 9 years, while I was Chairman, who could tell us how to feed beef cattle. I think the Institute has done us a lot of good and I did all I could for it; but your programs are too long and, with all due respect to the speakers, many of them come there and are not competent in the community where they are talking—I will be frank with you. Now we have had elegant speakers and speakers who knew their subjects, but it has been my lot a few years ago when I was in the dairy business, for a gentleman to get up and discuss the topic of pure bred sires at the head of a herd, and I asked him this pointed question, "What kind of a pure bred sire have you?" He says, "I never owned one." Gentlemen, that kind of argument will do no good in our county. Give us a practical man, a man who can stand up before this audience and tell you, "I am doing it to-day, come to see me and I will show you;" I am from Missouri. (Applause).

The CHAIRMAN: I think your programs, Mr. Herr, as I understand it, are usually made up by your county chairman and the responsibility for your program absolutely rests with your local people. We are getting along very slow. We have three addresses this afternoon, one by Mr. E. B. Dorsett, of Mansfield; one by Mr. S. W. Funk, of Boyertown, and one by Mr. Howard W. Selby, of Philadelphia, that I think you will all enjoy and which we are anxious for you to hear, and I would like for all the subsequent speakers to confine their remarks strictly to the question and cut down the time to two minutes and then they will perhaps get through in five. (Laughter). The next county is Lawrence, Mr. Doris L. Fulkman.

MR. PIOLLET: You ought to set the example for the Chairman of the Farmers' Institute; you have got a watch; why don't you call them down? When I was chairman of the Farmers' Institute and a man talked over his time, I would call him down and I would do it again.

MR. FULKMAN: As I am a new member of this Board, I do not think it is fitting for me to take your time and tell you how to run county institutes, and I think I will just give my five minutes to somebody else.

The CHAIRMAN: Lebanon county, Mr. Edward Shuey.

MR. SHUEY: I am not here to make a speech at all. I thought that this meeting of the County Chairmen was to give us information about what to do next year. But so far it seems to me it is more an experience meeting than anything else and we did not get any new suggestions as to what is to be taken up for the next year.

I have not asked the Department for anybody special at all before this, whoever they give us we were satisfied with in Lebanon county, and I think every speaker that has been in my county was satisfied with the accommodations I tried to get for him. We know that we cannot give them all they would like to have, but we accommodate them the best we understand and know how to do, and about the publishing of the Institutes, I have been in the work ten or twelve years and I have tried different ways of making announcements for the Institutes. I get our county papers, the daily and weekly papers, to announce the whole program, and one time we had a movable school at Jonestown four days; I went myself and got the programs printed and then went to most of the schools in the two townships and gave the teacher a program for every family in that school, whether a farmer or another family, so that every family in the district got a program a week ahead, and that was the smallest attendance we had in the county since I have been working as a county chairman, and then I said "It is no use spending so much time for advertising and sending out programs to the different committees, that they shall carry them out and get it published in the papers and put up the posters as they are sent, and that is all I am doing and I think it is all that is necessary, but I learned by that experience that if you go too far, you will spoil the whole thing.

Another question comes in there about the attendance. It just happened that those four days were the beginning of December and they were bright and nice and warm days and every farmer wanted to work at home to get his work out of the way for the coming winter, and that had a great deal to do with it. and so I have had no new work, only in regard to the program; some said cut it down short. I say put three questions or four for every half day and get your man in the Institute to ask questions, and as soon as they don't ask any more questions, that man ought to stop and not stand there for a quarter of an hour and talk yet when there's no questions asked, when the people are not interested any more; as soon as they stop asking questions, that man ought to stop and be done and let the other one have a chance.

The CHAIRMAN: Lehigh county, Mr. P. S. Fenstermacher.

MR. FENSTERMACHER: Everybody is starting as a new member; new chairman. That reminds me that I am getting to be an old member, pretty near quitting time. I remember the speakers when I started out as chairman, Col. Woodward, they talked on roads, schools, dairying—I won't make a speech—the question of hall rent also came up. We are paying too much for hall rent. Is it possible, if I could get people or a location where they won't demand any hall rent, is it possible to have two days more of the Institutes?

The CHAIRMAN: It is just a question of money; our appropriations are limited now, and we could not promise it now.

MR. FENSTERMACHER: If I could get a definite answer, I could cut out the hall rent business altogether by guaranteeing them two days more Institutes.

MR. FIRST: We would have to find out how one expense would compare with the other. If we should give you two more Institutes, it might cost a whole lot more money than the hall rent.

MR. FENSTERMACHER: Two topics are sufficient for half a day's session. The attendance is measured by the state of the weather, in Lehigh county. Altogether, the speakers are all right, we have no complaint to make. I try to make them pay their transportation from institute to institute; am I right? Must the Institute speaker or the Chairman pay the expense of a conveyance from one institute to the other?

The CHAIRMAN: Why, the Chairman has been doing it.

MR. FENSTERMACHER: Then they had reason to kick and kick me hard, because I did not do it on several occasions. In regard to advertising, we have no trouble in Lehigh county; I never spent a cent on advertising. I am a friend of every man in Lehigh county. They say, "We always get some news from Fenstermacher;" and when I have something I want published, they will do it. They give me all the advertising I want and no questions asked.

The CHAIRMAN: Luzerne county, Mr. J. E. Hildebrant.

MR. HILDEBRANT: We all tell so near the same story, each has a little different way of working out our plans and our interests. I worked a little different than some of the rest. We meet, of course, the second Tuesday in June and when we meet, and the gentleman comes to the courthouse and asks for the Institute, I want him to substantiate that he will take interest enough to write it up and see that we have a successful Institute, and then I try to have for Chairman, the man who is best acquainted in the location and takes an interest and choose the subjects that would be of most interest to his people, and if the speaker that is sent to us is not adapted to our county, the same as the brother here has referred to, I have taken it up with the Director and I think that is the place to rectify that, the Director and the County Manager, and I think the Director should rectify it and send me a man who can discuss the subjects that interest our locality. I don't want a man to talk tobacco or poultry, because we have had so many failures in poultry and I don't care much for the statistical gentlemen; we have got State College men in our part of the State and they are full of that, but we want practical men who can tell us how to do it and prove that they can do it. The lecturers have to bear and forbear. If I can't bring out a rig that is quite as good as some others, they have to forbear with me and I forbear with them. But we have had very good lecturers, I can go further and say we had good ones not only last year but year before.

The CHAIRMAN: Lycoming county, Mr. B. F. Kahler.

A Member: As Mr. Kahler is not here, can I have two minutes?

The CHAIRMAN: Yes, sir.

A Member: About five or six years ago we had an Institute in our township and the seating capacity was about 450 and we not only filled that hall but chairs filled the aisles. We had nearly 1800 people at the five sessions. The point I want to make is this, we all know there are a lot of farmers in each community who are in for anything that will help them to the detriment of everybody else. If everybody is to be benefited, they are not for it; but there is always in each community one or two men who have a little breadth, who realize that one man cannot be prosperous without some of that prosperity leaking through on the rest. There was one of these men who took that in charge and not only called up every farmer that had a telephone in the community and told them about the Institute and invited them out personally, but talked with them on the road. The suggestion I want to make is this, that if each county chairman will sort of put it up to one man in each community and find the man that is a little broad and say to him "I depend on you to make this Institute a success," I think that will help a whole lot to get the people out.

The CHAIRMAN: McKean county, Mr. E. A. Studholme. Mercer county, Mr. W. C. Black.

MR. BLACK: Mr. Chairman and Gentlemen: In my thirteen years as County Chairman of Institutes in my county and in most every instance attending this round-up meeting, when I have found occasion to say the word, someone rose before me who said what I have thought much better than I could say it. I do not propose to consume much time to-day. I think our Institutes have been a very great benefit to us in Mercer county, I am quite sure they have been to the County Chairman. One of the chief benefits has been the development of more gall. You can ask Mr. Dorsett, who, in his closing address at one of our meetings, said the County Chairman took occasion every twenty minutes to tell him he was boss.

The CHAIRMAN: Mifflin county, Monroe county, Mr. F. S. Brong.

MR. BRONG: I feel that there is other work waiting that is more important than anything I could say, and therefore I forbear.

The CHAIRMAN: Montgomery county, Mr. J. H. Schultz.

MR. SCHULTZ: I object in the first place to the way we are told to print our programs. I do not think we ought to print the programs and the Institutes of one county on one sheet of paper. I believe that each Institute ought to have its separate program, for this reason, it is a means of getting the people out to the different Institutes. I want that program by itself, and then I want the Executive Committee, the Committee on Music, the Committee on Arrangements and I want as many peoples' names on that program as I can find to spread it all over the different sections. Then after that program is made up, those people feel honored because their name is on the program, they feel a certain amount of responsibility for the success of that Institute; they get notice that they are looked upon to see that the people in their particular section come out to the Institute and I think it is more economy if we do it that way than the other way. The only way we can figure economy is when we make a success out of it.

Another thing, by having that program printed in the local paper where that Institute is, that editor feels himself responsible, to a certain extent, for the publication of the news of that Institute, and I use it in that way to get in personal touch with the editor. He gets a little something out of it and he does more for you. Then I cannot understand why the people here object to the long program; I want the long program. If we go down into this dining room and have only two things to eat, we don't enjoy it very much, we want a variety. You don't want only a certain class to come to a certain Institute, at a certain session, you want all the people there at every session, and in order to have them and instruct them, you must have a variety of subjects. I can tell you in what condition I was this last season, I had three men allotted to me in my section, which was all right and would have been enough, but there was one man on that list I didn't like to have, not on account of the man, for he was a good man on his subject, but we are not in a trucking section and I had had him there before and the people blamed me for it and I objected to the Department and they sent me an extra man, a good man, and then it was all right; I had four men. I thought when they sent me the extra man they would withdraw the other man, but they didn't, I guess they couldn't, consequently, I had four men and put them on the program for the same session and that is where I put my foot in it. At last I threw up my hands and they ran the Institute.

PROF. MENGES: I didn't run your Institute. (Laughter).

MR. SCHULTZ: I feel positive that if we have short talks and talks to the point—you don't want to tell a man everything, you want to give him a chance to question you; if you learn the lessons for your child, you won't do the child any good. Let your man point things out, impress them on the people and that is the way to make a success, I think. There are other things that have been mentioned here and I cannot help but say a word on them also. I think that the speakers on the platform ought to have respect enough for the audience not to sit there and open the morning newspaper and read it right before the public. Now those things we are supposed to tell at the Farmers' Institute. This is not said in any spirit of criticism, and those people, I can see their position, they hear those talks day after day, week in and week out, and they get sick of it and want some change, but I think it is far better if they withdraw from the room to read their papers.

The CHAIRMAN: Montour county, Mr. J. Miles Derr.

MR. DERR: Ladies and Gentlemen: It seems to me that we Chairmen this afternoon are taking a rather pessimistic view of our work. I think we ought to be a little bit more optimistic. I don't see that we have any reason to complain quite so much about our meetings. I was Chairman six or seven years ago; I think I had the best meetings and the largest attendance I have had since

I became Chairman. My attendance has not been so large since that, not because I am getting old and indifferent at all, but at that time we had a good place to hold our meetings in, a small borough in the center of the county, three churches there, and we had an attendance of as high as five, six and seven hundred people at a meeting. I have had a whole lot since where we have had anywhere from 25 to 50.

Now I can tell you just why we cannot hold our Institute at that small borough since that time; about 5 years ago we had an old gentleman at one of our meetings one evening and he was full of funny stories and he displayed himself and his story told rather too freely on the platform and some of the members of the council of that church were old maiden ladies and widows who were over pious, and from that time on we have not been able to get those churches as meeting houses. I do not blame any of you speakers for that, because the speaker who made that blunder is not with us today; he has gone to his reward. I do not feel blue about that any more. I was assured a few days ago that we can hold our meetings in that borough; I think we ought to do a little smiling. There is not a single lecturer there but what gave us pleasure and they are welcome to come back there.

In regard to getting attendance at the meetings, the further I go away from the county seat, the larger the attendance will be. When I go to Whitehall, 14 miles away from the county seat, I can get the church, a large, commodious building, and get the hall filled. I offer prizes at times to see who will bring the largest load there. We had one load of sixty some people, school children, and all of them brought on one sled. With these few remarks, I won't take up your time, but I think you fellows have had a larger attendance in the past year than the previous year, therefore we have no reason to complain. Try and increase the number next year.

The CHAIRMAN: Northampton county, Mr. C. S. Messinger.

MR. MESSINGER: There was a lot said that it is not necessary for me to repeat. I think we had the best Institute last year we have ever had. Our county is connected by trolley and railroad system from one end to the other. We make it our business to hold these Institutes, if possible at one of those lines. One question I would like to ask here—Mr. Fenstermacher said, "Are we expected to transport the speakers from one place to another?" And I believe that was answered yes. Do you mean that I shall transport the speakers from one Institute to another by rail or only by conveyance from the station?

MR. FIRST: That means that you meet them at the railroad station and convey them to the hall.

MR. MESSINGER: It was not stated that way.

MR. FENSTERMACHER: I didn't ask that question.

MR. MESSINGER: He asked him, "Am I to transport the speakers from one Institute to another?" And the Chairman said, yes.

MR. FIRST: The Bulletin gives you that information.

The CHAIRMAN: By way of explanation with reference to that matter, as there may be some misunderstanding. As I understand it, the lecturers pay it by trolley or by rail. If you have a livery rig, you pay for the rig and send your bill into the Department.

MR. MESSINGER: I understand it that way but the question was not answered that way. I also want it understood that we hold our Institutes at places where their coats don't smell of the cow stable after they go away. About printing the posters, I think that the Department ought to print those posters for each section complete. Now they are printed in a skeleton form, sent to us, we send them to the printer and pay about as much again as it would cost the Department to print them and send them on to us to send out. You don't want me to take your posters as you send them, write in my old farmer's way, the names of the speakers in those posters, and their places and the subjects, etc. We have to get them printed. Now I believe, as was stated this morning by one of the speakers, that we ought to have a little more mail communication with our members, such as postal cards and letters, printed complete, so as to simply write on the address and send a special invitation to the different people throughout the county. We had a very hard section to get our people to the Institutes. Whether they do not know it or not, I don't know. Now, as far as the rest is concerned, I would have a good deal to say. I am no young man in the work, although I am not one of the oldest; but so much has been said that I do not want to take up your time. I want to thank you.

The CHAIRMAN: Northumberland county, Perry county, Philadelphia county.

MR. CLARK M. BOWER (Perry county): We are always glad to have the Farmers' Institutes in Perry county. I attend all the Farmers' Institutes. The trouble is we do not have buildings large enough to hold the people at some of the sessions; and I want to thank the Department for sending such good men, they are always welcome. We advertise the best we can in the papers, but they turn out and I send notices to school teachers and have them announce in their schools for the children and parents to come, and they are doing a good work. I cannot say too high words for all the speakers that are there; sometimes I am afraid we expect too much of a State lecturer; sometimes we think a common school teacher ought to know everything and answer all questions. They are only human, but they have served the district and the county very faithfully and the people asked to have them back at the next Institute there next winter, so if the State will give us more days, we will surely find places for the lecturers.

The CHAIRMAN: Pike county, Potter county.

MR. CRITTENDEN: Mr. Chairman, I have no fault to find and no criticism. The speakers have done fine who have been sent to our section. I have tried to do the best I could for them.

The CHAIRMAN: Schuylkill county.

MR. JOHN SHOENER: During my seven years of Institute work, I have tried to reach as many farmers in Schuylkill county as I possibly could. Those who are acquainted with the physical geography of Schuylkill county know that we have a broad mountain and a lot of valleys and it is a large county and it takes some time to cover the entire county and reach all the farmers. These Institutes have been held for thirty years and still I am sure that one half the farmers in Schuylkill county have never seen a Farmers' Institute. The attendance may not be as great as in some of your larger agricultural counties, for the simple reason that the farmer would have a greater distance to come. If you take those Institutes through the boroughs of my county, I would have a larger attendance, but it seems to me that too much stress is put upon a larger attendance, and I would rather have a dozen or twenty-five interested farmers than three or four hundred children and people that come there for amusement. I know that we are doing good work and that the work has paid dozens of times where we have an attendance of only twenty-five or fifty, and those lecturers who have been doing our county can bear me out.

Now in regard to the advertising, I would have those posters sent out around sections where the Institutes are to be held and then I would have a number of programs printed, which I would send to the public schools and have them sent to every family in that community or near around.

The CHAIRMAN: Snyder county, Somerset county, Sullivan county.

MR. G. E. BOWN, (Sullivan county): As I am practically a new man at the wheel, I do not feel as if I had very much to say. I do not care to be hauled off the floor, never have been and don't want to commence now. I would like to say that in my short experience, the instructors sent to us have been general; I have had no use for an alarm clock or anything of that sort. We heard this morning something about transporting the gentlemen. As you know, Sullivan is a back county and not the best with either railroads or electric roads. I want to say to you that with the mercury standing at twelve or fourteen below zero, taking some five hours to make eighteen miles, there isn't anything funny about traveling there.

The CHAIRMAN: Susquehanna county.

DR. E. E. TOWER: They commenced on five minutes and got down to two, and I thought it would probably be all out before it came to me. There are just two little things I want to speak of; one is in regard to the time the Institutes ought to be held. I see no reason why the Institutes cannot be held up in the northern part of the State in the earlier part of the season and then work down through the State. As the season grows colder, it is almost impossible to get around that part of the northern tier of counties when it is so terribly cold and we cannot get a crowd there as we would if the season was in a little different shape. In the earlier part of the season we will secure a great deal larger attendance. My Institutes last year were not up to standard, for the simple fact that I only went into the business three or four weeks before the Institutes were held, and was told they were advertised and I afterwards found they were not, consequently I do not like to take all the blame for the Institutes.

Another thing is in regard to the speakers. It seems to be there should be a better understanding between the County Chairman and the Deputy Secretary in regard to the wants of certain localities. Nobody is to blame for this, because a man who lives in Harrisburg cannot possibly know the conditions of the counties up in the northern tier and what those people want, unless he has been there. Now there was no County Chairman in that end of the State.

MR. FIRST: Do we not say in those circulars that you should specify the kind of topics you want taken up?

DR. TOWER: You certainly do.

MR. FIRST: And in every instance where we get that information, we try to furnish that kind of a man. If you don't tell us that, we don't know what you want.

DR. TOWER: I do not wish to get up any argument at all on this; but I have made that request and we have varied them up in that end of the State and I don't know when we have had a practical dairyman there. Of course the conditions are so very much different down in other parts of the State where they are doing a larger kind of farming than up there, and those lecturers should be changed and give us somebody that understands the dairy business up there. I don't say this in any complaining way, I say this as a matter of improving the conditions, and the County Chairmen will bear me out.

The CHAIRMAN: Tioga county.

MR. C. H. De WITT: Mr. Chairman and Gentlemen: I don't know that I could add anything to what has been said. We are a pretty good feeling lot of fellows up in Tioga county and it takes a good deal to ruffle us. I have had Brother Hutchison there with me and we have had some glorious good times, and I tell you, Mr. Secretary, they did us a wonderful lot of good. They have been invited to come back, and that is the best evidence in the world that they have given good satisfaction.

Mr. First asked a question of the last speaker there, and I want to say that with me he has always been very kind. He never has sent a poor man into our county. I have always tried to make out the list and send in to him and he has been very fair with us up there and always sent us good men. One thing he understands and the Deputy previous to this has understood, that Tioga county wants him to send practical, experienced men. We want men up to their jobs and don't want anything else, and we have always had them.

I tell you, Mr. Secretary, there is one thing I want to say while I am on my feet, it may be a little bit to the point. There are some men who go out and purport to lecture to our people who ought to be at home looking after their own affairs instead of telling the people how to do certain things. I will call to your mind—just bear with me a minute, I don't want to take up any more time than I ought to—a certain man in the southern part of this county came up into some of the northern counties—this I know to be absolutely true—he wanted to see a certain lecturer's farm, he wanted to see his stock; he hired a livery rig in a certain town, he went out to see this stock and he went out to see this man's farm. He asked the livery man, "Do you know where he lives?" "Yes, sir, I will take you up there for $2.00." "All right." He drove him up and he stopped at a certain place and said, "Here is the farm." "You don't mean to say that here is the farm of this gentleman?" "Yes, I do, this is the place." "Do you know that this is the place?" "Yes, sir, I know that this is the place. You needn't ask any more questions, I know where I am, I always lived here; I know this place." Said he, "Drive on." "Ain't you going to get out?" "No, I've seen enough."

Now, as Chairmen sometimes we have those very things put up to us. That very thing has been said to me. Now, the fact of the business is that I never have been imposed upon by any of that class of men, and Mr. First has always been kind to me—and the Deputy, in sending us good men. We have got a good deal to be thankful for, to think we have got men as capable as they are to come to us and talk to us, and we have had good attendance and grand, good things and they have done us a lot of good.

The CHAIRMAN: Union county.

MR. J. N. GLOVER: I just want to second what has been said in regard to the shape of the poster; I would like to see the shape, size and color changed every year and I would be glad if they would print on them the names of the speakers as well, and when they send out any document, I wish they would send vouchers to us. For three different years I have had to write to the Department and ask for vouchers, and I am getting tired. In regard to speakers, I have been at it for sixteen years and I attended Institutes for seven years more and I want to say that the tone of the lecturers has improved, we have more practical men. Years ago I used to suggest to the Department that I did not want any tired, retired or theoretical men, and now I think they are giving us practical men. That is what we want. We have a good class of farmers in Union county and it takes a good farmer to come and tell us how to farm better than we are farming now, so we haven't any use for a man who cannot make good in his own community. We have always talked along the lines of production. Why should we produce more to get less for it? I think it is time to talk about how to distribute to make more money out of what we produce. If we cannot make more dollars out of our farms by doubling our crops, what is the use of doubling them, simply for the railroads to haul? Let us talk along that line.

The CHAIRMAN: Venango county.

MR. H. C. CRAWFORD: I have never held a Farmers' Institute, therefore I do not feel capable of advising on it.

The CHAIRMAN: We are now getting up to the most favored spot in the State of Pennsylvania, Washington county—is Mr. Paxton here? Wayne county; Westmoreland county; Wyoming county; York county.

MR. BARNES, (York county): We had an attendance last year of about ten thousand people. So far as posters are concerned, I don't care if they don't send us any. I use them out of courtesy to the Department. We have had an elegant set of speakers at all the Institutes ever since I have had charge of them in the last twelve years. We try to furnish places suitable to accommodate the greatest amount of farmers and their families throughout our county. We do our part and are blessed with everything in our county except gas and the Department has furnished a good lot of that.

The CHAIRMAN: Gentlemen, we have devoted quite a lot of time of this session of the Institute in order to give the Chairmen of the different counties an opportunity to be heard. As I said or meant to say earlier, when I first opened the session, to me this is the real important session of our Normal Institute. The others are instruction and entertainment brought in by outside speakers in addition to our own lecturers. This is your meeting, and for that reason we have devoted more time to it than we perhaps otherwise would have done.

I want to call your attention—it seems to me there were one or two remarks here to-day that might have been considered in a more serious sense than should be, inasmuch as it has been referred to at different times and reflections have been both ways. The attention of our lecturers has been called very frankly to some things that they have been doing that are not altogether satisfactory to the hearers, as well as to the Chairmen under whose control they were at that time, the matter of reading newspapers and things of that kind in the presence of the audience; the remark of one of the speakers about his treatment at a hotel and the facilities for transportation, etc. I do not think it was intended in any way serious and I sometimes feel that here on one or two occasions there might have been some reflections cast upon those who made those different remarks.

Now with reference to the work in the future, I want to say that you can all be quite an advantage to the Department of Agriculture. The success of our Institutes, the number of sessions that are held in different counties, the kind of speakers we get and the interest we can stir up depends largely upon the amount of our appropriations. I think you should all keep in very close touch with the members of the Legislature from your different counties and make a special effort to get them interested in that phase of our work. With an increase in our appropriations for this work, we can undoubtedly increase the effectiveness of the service.

With reference to the different kinds of speakers that are sent in to the different localities, you all have heard, what we heard repeatedly, of the diversified interests of our State. Mr. Herr mentioned the fact that they had never had a man experienced in the matter of growing tobacco sent into Lancaster county. You all are aware that the growing of tobacco is confined to a very small section of the State of Pennsylvania, and in order to be able to send a man down there to talk on tobacco culture, it would be necessary for us to get a man from that county. But we shall endeavor at all times to send a man into your different sections, your dairy sections and others, who are practical and experienced. I hope as soon as we get settled down after this Normal Institute, to visit the homes and farms of each of our lecturers, and for that reason I am anxious, as has been mentioned here by Mr. De Witt, I believe that we ought to have men address the farmers of this State, who are putting into practice what they are preaching. In addition to that, I may go further and visit the homes of some of our County Chairmen; I want to know that they are enthusiastic in the work and that they are representative citizens, which I know they are, and know also that they are what they feel they ought to be.

Now I want to call your attention to this address to-night of Mrs. Morgan. She is very highly spoken of and I hope you will have a good attendance and that every member here will make it a point to be present and hear this instructive talk, as we expect to have a piano here for her demonstrations. We hope at that session also to give an opportunity to Mr. Seeds—all of you are very familiar with his lecture; he has only asked for ten minutes time. I had fully expected to give him the time in the forenoon or afternoon session, but it is now growing late and we will devote the remaining part of the session to the program for the afternoon. The Chairman for the afternoon session is Mr. McCallum.

MR. WATTS: Unfortunately I made a remark this morning in reference to the matter of the transportation of the speakers and also referred to the hotel accommodations—I am the man that said it, I don't deny that and I am not here to retract anything; I simply think this, that all of us, in order to get through life properly and with the respect we ought to have, must observe a degree of decorum and cleanliness and neatness that will command the respect of the better people around us. I used to market butter to fifty-five families in Clearfield, and when I went down there to market the butter, I had been clearing land, rolling logs, handling the cradle and in the winter time cutting wood and my hands were rough, but I washed them the very best I could, parted my hair in the middle and cleaned up and took my butter to the market that way because it helps a man in his business to keep clean, at least, and I have never spent an hour idling around the corners in Clearfield county in my life. I never went to town, as a boy unless I went on a particular message for my father or mother, and when the errand was done, I went home. It does not add to a man's dignity to sit in a little grocery store and swap stories; neither does it add to his dignity to ride in a vehicle that is not right. I am not one of those kid glove fellows; I swing the cradle and all that, so I don't want you to misunderstand what I meant. I know that in one of those few cases it was quite unavoidable, I think so, at least, and the gentleman is in the audience; in the other case it was not and the man said he didn't care. He is not a chairman to-day, he is not as capable as some of you men who are chairmen to-day. I am not retracting anything.

BETTER MARKETING FACILITIES

By E. B. DORSETT, *Mansfield, Pa.*

THE STATE'S DUTY TO AGRICULTURE

How far the State shall go in aiding any trade, calling or profession, is a question that is occupying the minds of all thinking men and women. Our State has many varied and important industries. None of them independent and all of them dependent upon Agriculture, the greatest and most important of them all. So great and far reaching is this industry that were its wheels blocked for a single day all others would either be crippled or hopelessly paralyzed. We have only to turn the pages of history to learn that whenever a nation neglected her agriculture her downfall began; and what is true of a nation is true of a state. We determine the wealth of a state by the fertility of her soil, her industries and natural resources and the character of the men and women who till her soil and develop her industries and natural resources.

Agriculture being the one industry upon which all others depend, the one which makes it possible for vast numbers of her citizens to live in large cities and industrial centers, where lucrative employment may be found, it is important that the State should render such financial assistance as shall be needed in promoting her growth and extending her usefulness to all her citizens.

Legislation which seeks to foster agriculture and make a just and equitable distribution of her products, is not class legislation, as it benefits the entire citizenship of the state. We determine the power and efficiency of a state by the ability of her citizens to render service. This may be military, industrial or professional, and is raised or lowered by the manner in which they are clothed and fed, and by the amount of wages received for the time and labor expended. The best citizens are the loyal, happy and contented ones, who are kept busy on the farm, in the mill, the office or the factory, at wages or returns for their labor, which enables them to provide the necessary comforts for the home and family.

On too many farms in our State to-day, the farmer and his wife are discouraged, the boys and girls are leaving, simply because the returns for their labor are not adequate to permit them to enjoy even the modern necessities of farm life. Again, in too many homes occupied by laboring men employed in shops and factories, want and suffering are found not solely on account of the low wages received, but largely because of the high prices which must be paid to feed and clothe their families. Why these two extremes? The answer is that the system of distribution has become too expensive and needs changing. The State should seek to improve the system, rather than attack the men who have built it up. This cannot be done by drastic legislation, or by trying to upset old and established business methods, but can be done by creating a Bureau of Markets, with authority to collect crop statistics, gather information relative to crop shipments, give assistance in grading, sorting and packing, organize and establish buying and selling clubs in small units, teach and encourage farmers to grow and produce the same products, in order to facilitate marketing and ensure better prices; in short, to act as a Clearing House for the farmers of the State, directing the streams of products which flow from their farms, thus preventing, in a measure, market gluts and congested freight conditions. All this could and should be done. It will not require a large expenditure of money but will require keen business foresight and intelligent organization.

The farmer has grown tired of that old saw about making two blades of grass grow where but one grew before. Show him how to get more money for the extra blades and he will grow so many that there will not be room enough to stack them out of doors. There is but little use in preaching the gospel of increased production, important as it is, when the farmer knows full well that he is not getting a just return for that which he now produces. He is not asking for aims, charity nor special favors, but he does ask that he be given a fair chance and equal opportunities.

THE FARMER AS A BUSINESS MAN

How often we hear the statement, "That the Farmer is not a Business man." The statement is false as can easily be proven. He is too busy producing his crop to give much time or thought to marketing it, which is a separate and distinct art of profession. That Philadelphia makes goods and New York sells them, is a well-known fact. There would be as much sense and justice in saying that the manufacturers in Philadelphia are not business men, because they do not sell their goods, as in saying that the farmer is not a business man because he does not sell direct that which he produces.

THE STATE'S OPPORTUNITY

It is at this point that the State can be of the greatest service to the farmer. The marketing problem is not unlike a great, unmanageable river. Some would control it by working only at the mouth and force all products to flow through definite channels in the large cities. This is the method most commonly used and is the one that has become the most expensive. Others would go to the sources, and examine the water-shed, or the place where the products are produced. They would divert certain streams there to other parts and retard the flow of others until a more appropriate time. Floods are due not so much to too much water as to unequal distribution of the flow. At any time perishable products in season may constitute a flood.

Obviously, the agencies at work among the mountains, on the hillsides and in the valleys, along the streams, are in a better position to control the flow than all the engineering conceivable at the mouth. No doubt much could be done in congested centers to facilitate distribution and reduce hardship. But a state-wide plan which puts producers on the alert to co-operatively avert waste and confusion and market their products in a timely, honest and business-like manner has much to commend it and should be put into operation by the State. It represents constructive work that appeals to the farmers, who are learning that true co-operation does not mean criticism and tearing down, nor the development of class prejudice, but means that all interests shall work together, "All for one and one for all."

The end of the present world war will find all Europe's efficiency organized for the production and distribution of food products. The stern necessities of the nations engaged in war gave a great impetus to this movement, and the success with which the governments have been able to make use of the co-operative societies in assembling products of the grade and quality required for the army has constituted a practical demonstration of the value of co-operation. The new methods, with their savings of effort and money and with their efficient management, have come to stay. This new system acquired in time of war will remain when peace is restored. The American farmer must be ready to meet this change, or defeat will overtake him. With few exceptions this country has developed no marketing system worthy of the name. Agriculture is almost unorganized and marketing is still on the old basis where waste exacts a tremendous toll. The fact is, that the markets and the financing of agriculture have made but little progress during the last quarter of a century. Improvements have been made in transportation facilities and in a more efficient financial service, but these have not touched the real problem. The farmer is still compelled to use the market machinery, worn and antiquated as it is and with which he had but little to do with installing, to get the products of the farm to the consumer.

Here and there standards for the marketing of certain crops have been worked out, but generally speaking, there are but few standards for the marketing of farm products. As a result of this condition disputes, misunderstandings and bad feeling naturally arise. The problem of marketing, therefore, not only includes the proper standardizing of the product and the placing of it in proper carriers and containers, but it has to do with the transportation, the grading and packing, its display in the city market, the sale of the product and the accounting for the moneys received as well. The common carriers have improved transportation facilities and have in many instances lessened the time in transit, but the method of displaying products in the city market and the cost of selling is still too cumbersome and subject the farmer to unnecessary expenses.

INDUSTRIAL ORGANIZATIONS CO-OPERATE

The great industrial organizations have learned the co-operation between the different branches and departments is absolutely necessary for permanent and financial success. Agriculture with its many individual producers, occupies a very different position, but the difference is not so great that the farmers cannot profit by the lesson taught through the experience of these great industrial organizations. In foreign lands organization and co-operation are recognized as cardinal principles. One has but to point to the organization of agricultural activities in Denmark, Germany, France and Ireland to bring witness to the truth of this statement. It therefore is important that the farmer should come to a larger appreciation of the necessity for co-operation between the agricultural groups and in each community center. His political views should not be allowed to interfere with the progress of this work. It is not a question of socialism or individualism, of democracy or republicanism; it is a question of efficiency, social and financial betterment.

WORKING OUT THE NEW POLICY

Accepting such lessons as have been taught us by the old world, the time for consideration of the marketing problem is at hand. Agricultural difficulties are so far-reaching in their social effects that they must be approached from different angles and inspected from different viewpoints. It is time for the farmers of a great agricultural state to study and formulate the principles which underlie the successful expansion of the nation's greatest industry. How can individual farmers work with their neighbors? How can the several Subordinate Granges work with other farm organizations of similar character? How can the many and varied farm interests be correlated so that they will work together systematically and intelligently? The confusion of the present must not longer continue. The answer is to be found in a Bureau of Markets to be under the jurisdiction of the Department of Agriculture and to be managed by a Bureau head the same as other Bureaus are managed. The head of this Bureau should have the authority to examine into the methods of production and distribution of farm products with a view of evolving a system of greater economy and efficiency in handling and in marketing.

To supply instructors and lecturers upon the subject of co-operation among farmers, auditing and accounting experts and legal advice in matters relating to farm organization.

To issue reports and pamphlets and instructors which will help in spreading knowledge of the best means of rural betterment and organization.

To organize and co-operate with all farm organizations, local branches or associations, for the promotion of "better farming, better business, and better living."

To encourage and co-operate with educational institutions, departments, societies, educational centers and bureaus, in all efforts to solve the questions of rural life, rural betterment, agricultural finance, marketing and distribution of farm products and the special application of the facts and methods discovered relative to the conditions existing among the farmers of Pennsylvania and to the solution of the problem of increasing the cost of living.

The possibilities for the usefulness of such a Bureau, both to producers and consumers, are simply immeasurable and I urge this body to ask the next session of the Legislature to make it possible by suitable legislation. Thirteen states already have such Bureaus and Pennsylvania should never be satisfied to follow, but should take the lead in every movement that tends to promote agricultural interests and improve farm conditions.

MR. DORSETT: I want you to get this, fellow farmers, that we purpose to start a series of organizations; it may be the grange, it may be a farmers' club, a farmers' union or simply a company of ten or a dozen farmers, it doesn't matter, but we propose to have them organize and then through those organizations work, through the Department and in that way keep each other in touch with the market conditions. Here is a letter received last night, and it is so near the point, I want to read it to you:

"Dear Sir: I am writing about an organization and ask you several questions relative to the formation of a co-operative Egg Association. Mr. Theodore Wittman, the expert poultry lecturer, said I was to write to you and said you would give me all the advice I would need to know. Well, the first thing I would like to ask you is this; do you think it would pay us to organize, and if so, would ten members be enough to start a co-operative Egg Association? And also in what way would you think it best to go about it? Would it cost much to start, and if so, how much? Would you hire a man to sell the eggs and to sort and grade as to size, color, etc.? Would you find a regular selling market, or pay a man to look after this for us? Therefore, hoping I may hear from you, etc., I am,

Yours truly."

Now I give you that letter for this reason; we get a number of inquiries of that character every day. With this Bureau established at Harrisburg, as we hope to have it in the near future, instead of writing direct to me, you may write direct to Harrisburg, and it matters not whether you want to buy or whether you want to sell, the thought of the Department is to put the two together and to give you the information that I know you so much need.

Now we want your help in this; it is a big problem, and don't expect too much. If we had more time, we could tell you more about the market reports we are now getting daily and as to what use will be made of them. I want to say this to you in conclusion; if, at any time, at any of your agricultural meetings, your farmers' club or your grange meetings, I can be of service to you, I will be glad to come and explain this proposition more in detail than I have this afternoon. (Applause).

PREPARATION FOR MARKET.

By SHELDON W. FUNK.

Mr. Chairman, Ladies and Gentlemen: I believe that this is a very important session this afternoon and I am only sorry that we do not have a little more time to discuss it. I would like to take up some of the questions that I know you people have in your minds along the subject I want to talk to you about for a very few minutes. I will treat the subject just as quickly as I can, and then if there is any time for questions, I will be very glad to take them up.

We have come to look upon the marketing question or the marketing problem as a very complex one, and I believe it is a complex one, but I believe the main reason we seem to think it is a complex one is because we have not studied it as much as we have studied the problem of production, and the time has come, as the former speaker said, when we have got to study the problem. I do not believe that we are going to make any radical changes; the marketing problem has been before us too many years, it has been studied by too many men and we are not going to make any radical changes to-day. Sometimes the farmer says, "I am not getting anything for my produce, the commission man is getting it all." The commission man says, "I am not making any money, it is the other fellow that is getting it." I do not believe that it is the fault of any one man or combination, I believe we are all in the same boat, we have got to correct our methods a little bit and the farmer has got to correct his. I believe the commission man can do something, the transportation company can do something, the jobber can do something. I know the retailer can do something and the consumer can do something to help solve this problem of marketing. We have all got to do a little if we are going to straighten it out.

I am satisfied if we are ever going to solve the problem of marketing in the State of Pennsylvania, the thing we have got to build on, the advance guard of the whole proposition is better grading and packing. There isn't any man in the world, I don't care how good a salesman he is, that can sell something that is not good or can sell something that the buyer does not believe is good, and when one of you men goes out to buy a horse or you want to buy an animal of any kind, you want to examine that animal and be sure about it, and when a man goes out to buy a barrel of apples, all he can see is the top and the bottom, he does not know whether there is a lot of poor stuff on the inside or whether the entire barrel runs as it is on the top. And I say that until we get some system of grading or packing whereby, when a man goes to the market to buy a barrel of apples, he knows he is going to get just exactly what he sees on the top of the barrel. I cannot see how in the world we are going to solve the problem, and I thoroughly believe that the problem of better grading and packing or that the only way in which we can put the marketing problem on a scientific basis is to establish a better system of grading. Take Pennsylvania, I have visited a great many men and I know there are lots of men in the State that are getting good money for the things they put on the market. Why? First of all, because they have studied their conditions, they have studied the kind of produce they can produce best of all on that particular farm. Secondly, they have studied their market, they know what it wants, what kind of produce it wants; and the third thing, they have become acquainted with their commission men; they are not dealing with a fellow they don't know, but with a fellow they do know, and they are making money, and if there is one man that can make money in that way, there are more men in the State of Pennsylvania that can make money in that same way.

I want to say a few words about the packages. Pennsylvania is more of a fruit producing state than she is of a vegetable producing state, and I am not going to say anything about the packing of vegetables, but I do want to say a few words about the packing of fruit. First of all, apples. The standard eastern package of apples is the barrel; it is the package that the Pennsylvania growers are going to do more with than any other package we have. The box package has not done very well in the East. I think the main reason is because the buyers have not yet gotten confidence in the Eastern apples that are put up in the boxes. I believe there is a time coming when the box apple will do a good deal better, that is, the Eastern boxed apple will bring a great deal more money than it does to-day, but the barrel is going to be the best package that we have. Now then, in a few cases, I think that a smaller package can be used very well. The hamper works very well in some cases, but the hamper, like the box, is a package, as I see it, that can only be used, mainly be used, for high grade goods and on a high market. I cannot see that we can use the hamper or the box on a low market, such as we had this last season; but there is a chance for a number of men to use a smaller package, something on the order of the chip basket, or even a little smaller or possibly a little larger, a package that you can put up to the consumer, but of course in a proposition of that kind, the grower has got to come in direct contact with the consumer, but I believe there is an opportunity along that line.

As far as peaches are concerned at the present time, we are packing principally in the regular Delaware peach basket, fourteen and sixteen quart basket, Georgia six basket carrier, and in a few cases, the bushel basket. Now in this section of the State I think more peaches are put up in fourteen and sixteen quart baskets than any other way we have. A man shipping on to the New York and Boston market should use the carrier package, because that market prefers that package; and there are certain sections in the State of Pennsylvania where the bushel basket is the best package that can be used. But there again, each man must study out his proposition and find the package that is most wanted on that particular market; and also I think you will find that the bushel basket is the package that works best on a low market, where the smaller package works better on a higher market.

Just a few words about grading. Our fruit should be graded, first because it looks so much better; you can take a bunch of two and a half inch apples or a bunch of two inch apples, we will say, and give them to a consumer and he will take them and he will think he is getting good apples, but you throw half a dozen three inch apples into that basket of two inch apples and you have spoiled the whole proposition; at once he raises a kick; he says, "Why do you have all those small apples in there?" So for that reason it is very important that our apples be graded. And again, it is the only way that I know of that we can put apples on the market and tell the consumer or the buyer just exactly what is in the package. If we do not grade our fruit and grade it down just as close as we can, how in the name of sense is that buyer going to know what he can expect on the inside of that barrel?

Now I know it is a hard problem to grade fruit and a particularly hard problem for you to grade your own fruit; it is so very much harder for me to see a worm hole in my own apple than it is to see a worm hole in my neighbor's apple, a whole lot harder; and I often thought that if we graded each other's apples, we would do a whole lot better. If you grade your neighbor's apples and let him grade yours; I do not believe we would have nearly the trouble in grading that we do have at the present time, but when a man comes to grading his own fruit, it is a different proposition. It is the same way in the thinning business; I can thin some other man's peaches or apples but I cannot thin my own and I do not try because it is impossible, and I think the same thing holds true in grading, but nevertheless we must get down and get some standard grades.

I cannot tell you the names of the grades. We might take the grades that New York State has adopted or we might take the grades that Delaware has adopted, but I cannot tell you whether or not that is the best grade, I do not know, but the name of the grade is not nearly as important as it is to put up a good, honest, carefully packed, uniform package. We have got to put up good, uniform fruit, and just as soon as we people in Pennsylvania, we producers, put up good, uniformly graded stuff, then we have got a beginning. Then at least, we at least are doing our share. Then it is up to the next fellow, but I know, I am positive, tha the greatest reason why we have so much trouble with commission men, not the entire reason but the main reason why we have so much trouble with the commission men is, first because we have not packed our goods the way they should be packed, because they have not been graded the way they should be graded. I do not believe that all commission men are angels. I know there are rogues among the commission men just the same as among the farmers and every other class of men, but the farmer that sends goods to the market that are not graded properly cannot expect to get what those goods are worth, because the buyer is taking a chance, it is a gamble, he buys without knowing just exactly what it is; and I do not blame them sometimes if they do not give us as much money as we think we ought to have.

Now then, how are we going to solve this grading problem? How are we going to get the growers over the State of Pennsylvania to grade their apples or their peaches or whatever they are producing? I used to think that one of the best ways in which we could do it would be to pass a grading law, but I believe now that that would be the easiest way out of the problem if we could enforce that grading law but I do not believe in the method most states are using, and that is each state passing an individual law. I believe that if we are going to solve the problem by legislation, the only way we can do it is by National legislation. Now I know we have the apple bill of 1912, but I cannot see that the apple bill of 1912 has done very much good; I do not believe it is strict enough. Then we have the New York State Bill of 1915, the Delaware Bill of 1915 also, right on both sides of us, but a man can pack his apples according to the Delaware State Bill or according to the National Apple Bill. Then again a man buying apples does not know the different grades in each particular state. He may be buying a grade he is acquainted with in New York State and then buy a grade from some other man that possibly is entirely different;

he isn't acquainted with the grades, and the only way we are going to solve it, if we do solve it by legislation is by National legislation and make that law just as strict as we can possibly make it. That is one way.

Another way of solving the problem is to send out a large number of expert graders over the State of Pennsylvania and teach the growers. But we do not have the money and I do not believe we are going to do that. Another way is the matter that Mr. Dorsett brought up, and I think that is by a Bureau of the kind he mentioned and then getting the growers in the State of Pennsylvania to co-operate and be able to send a man, for a few days at least, into that particular locality and let him teach the members of that association. That co-operation will be one of the best and quickest ways of solving the problem. And last of all, we can solve the problem by individual effort, and possibly that is what we have got to do at the present time; let each man study the grading and the packing problem from the ground on up; visit your commission men in your big markets. Why I tell you, ladies and gentlemen, I never in all my life have seen as many poor apples, as much poor produce of all kind as I have seen this last year, and I cannot blame the consumer for not wanting to pay a big price for it and I cannot blame the commission man if he does not get a big price for it. We have got to put up good goods and put them up in good packages and in a good manner.

A Member: Would it pay a Fruit Growers' Association to hire a man to do the packing and selling for that Association? Send him out over the country and let him sell the fruit?

MR. FUNK: Under the present conditions I believe it would be the very best thing the association could do. It has been worked out pretty carefully in the West and it has been their only salvation. If it had not been for their co-operative associations that regulated the grading and the packing of apples entirely, the Western apple man would not be where he is to-day, he would have been done for a good many years ago, and that is the only thing, in my estimation that saved him.

A Member: How about market milk and butter?

MR. FUNK: I do not know.

A Member: Has not machine grading been successful?

MR. FUNK: There is a good bit of kick on the market about machine graded apples; it does not seem to do them any good, and I would answer that question in this way, that it has and it has not. For some varieties of apples, like the York Imperial and Ben Davis, I think the machine grader is the thing, but when you come to a tender apple, like the Winter Born and Nev, for instance, I do not think you would dare use it. It depends altogether on conditions.

MR. FENSTERMACHER: On this question of grading, we never will have the same kind of grading until we have a specialization of this matter of growing different things or producing them, that is, certain sections growing certain things, like they have out in California, then they can have their associations and can all be branded one way and there will be no trouble. With us every man has got his own grade. You may have the same law and the same idea, but they won't work out the same way. That has been my experience. We had a discussion on branding the other day. It is about the same thing in growing fruit; if one section would confine itself to peaches, another to apples and another to nuts, etc., it would be all alike and there would be no trouble.

PUBLICITY AND ADVERTISING.

By HOWARD W. SELBY, *Philadelphia.*

Your program for this afternoon's session is the most logical arrangement I have found in a large number of meetings. It is devoted to the development of "Better Marketing Facilities," and the first topic deals with the fundamental problem in bettering market facilities. Until the products of the farm, orchards and garden are properly prepared for market you will find the same faulty methods in their distribution and a resulting poor financial return.

It must be assumed in addressing you on the subject of "Publicity and Advertising," that you have now resolved to apply in minutest detail the recommendations made by the last speaker, because, without thorough and proper preparation of your product for the market, you have nothing worthy of being advertised. A fundamental principle in all sane and profitable advertising is truth, and unless your package is truthfully prepared and packed, all expenditures for advertising that product would be fruitless.

Attention has been forcibly drawn in the past few weeks to the series of five great conferences held in as many central western cities. Their purpose was to study the producer (farmer) and his attitude toward trade marked goods, together with other most successful methods of winning his trade. It was declared that the farmer is partial to nationally advertised goods and the merchant who continually stocks his store with such goods is doing an ever increasing business. When a salesman endeavors to sell to the farmer an automobile, a cream separator, implements, fertilizers or seeds he always finds more ready sale for those goods which are nationally advertised. This makes the contract which I wish to call to your attention; namely, that the farmer always calls for the advertised product but makes no effort to place his own product on a like basis. He is willingly and freely contributing to the expenses of placing other lines of business on the most modern basis, but is giving little attention to modernizing his own sales methods.

A great deal has been said recently relative to the value and import of publicity. Publicity might be termed a certain phase of advertising which tends to create a public opinion and sentiment on some particular product or person. It is usually couched in the form of news items when appearing in our press rather than in the columns where we look for the commercial advertising. You read of our great ex-President through the columns of our press and become a believer and follower after the principles which he prescribes. You firmly advocate that others believe as. you are converted to believe. Our elections are greatly influenced by publicity, because less than one per cent. of the voters know personally the men for whom they vote; they cast their ballot for the men whom their friends or their party or their favorite newspaper advocate or advertise.

Somewhere just a few years ago an individual in public office conceived the slogan which has been and is being repeated over this entire country: "The High Cost of Living." This slogan received such widespread publicity that it was repeated by every tongue in the nation and has found a large part in molding an influence over the minds and beliefs of the American people. The farmer was heralded as making such enormous profits that young men and older men in every vocation turned to the study of farming. A "back to the soil" movement resulted and to the astonishment of these aspirants for an easy fortune the majority have learned that gold dollars are as difficult (or more so) to produce on the farm than in other fields of industry and the professions. These men who were allured by publicity to the work of the farm failed to realize that publicity was a great factor needed to aid toward making a success in farming. Public opinion is moulded by the press and that which received most publicity is believed by the greatest numbers.

The time was never more ripe for the application of publicity to the building up of the farming business. Newspapers and periodicals everywhere are eager for news pertaining to improved farming methods, for facts which will relieve this stress of the high cost of living, for new ways in which to use the farm products and for improved means of distribution. Let a farmer do the unusual, the progressive, present the facts to the newspapers and nine papers in every ten will publish the story. The news of farmers' conferences has been published in the past two years with considerable detail and with the papers making requests to be notified of succeeding meetings.

Associated effort secures the most advantageous publicity, when the personal element is eliminated and all are working for one purpose. In the past season several successful campaigns were waged in an effort to increase the consumption on apples. An apple day was designated by the International Apple Shippers' Association but their effort was weak in this section of the country. No doubt their experience will prove of greatest value in organizing a campaign for apples in the next winter. With the increasing production of apples throughout the county it is imperative that the food value of apples and the many ways in which apples might be used be continually presented before the housewife and the consuming public. In Philadelphia, for three days in the month of March, an apple show was conducted by an organization of produce men known as "The Boosters," which is organized for the purpose of giving publicity to farm products in their season. At this show every variety of apples on the market was placed on exhibition in a vacant store along the most prominent thoroughfare of the city. Circulars telling the food, medicinal and health value of apples were distributed by the thousands and cook-books telling 197 different ways for using apples were handed to all the ladies. On the final day of the show an apple was handed to everyone who came to see the exhibition, and over 25,000 apples were given away. The results from such a display and expenditure cannot be directly estimated; but it is certain that a large proportion of Philadelphians talked apples during those three days and it goes without saying that talking apples results in eating more apples.

Last year I talked of a certain brand of Pennsylvania apples to a bank president, and in the season sent him a box of the fruit with compliments. Instead of treating his friends who called on business to the customary cigar, he gave them one of these beautiful apples. This scheme was found so popular that he continued sending frequent orders for the apples and discontinued for the time handing out cigars. His friends inquired where the apples were grown and where they could be purchased, with the result that many orders came from the first box which was sent complimentary. And you would have been interested in the manner in which this banker recommended the fruit and referred the prospective customers. A good product properly packed not only increases the growers' pride but the consumers' pride as well. Every housewife takes pride in serving the market's best offering and every man in treating his friends to some fine high-standard product.

Publicity is peculiar in as much as a slight impetus will cause it to multiply in rapid progression and with wonderful accumulative results. The first box of apples as a gift and matter of publicity was a profitable proposition as it created talk resulting in further and fast increasing sales on this particular brand of apples. Give your product a strong boost, keep "everlastingly at it" and the world or that part you serve will listen to your story and if your product is worthy, the boosting will automatically continue and your business will increase. Your greatest advertisement is a satisfied customer for he will serve as your publicity agent voluntarily and without remuneration beyond continued satisfaction.

In the issue of The Philadelphia North American on Tuesday last there appeared an article, nearly two columns in length, by Mrs. Anna B. Scott, calling attention of the readers to the fact that now is the time to eat rhubarb. The low cost of this product was emphasized, together with recipes showing that there are numerous ways in which to use rhubarb aside from a sauce and as pies. The Philadelphia Vegetable Growers' Association has considered securing the services of some eminent physician or chemist and have him prepare articles for publication in season telling the public of the food value and healthful qualities of rhubarb, celery, asparagus, lettuce and various other truck crops. The various associations with such aim are in their infancy but I feel confident that they will in the near future make their organizations effective at least from the standpoint of giving publicity to the products grown by their members.

An interesting experience in our household was about three months ago when a yeast cake was delivered with our grocery order and contained in a neat sealed envelope. On the reverse of the envelope from the advertisement was a recipe for potato biscuits. That recipe was given on the yeast envelope because it called for yeast in making the biscuits. We tried this suggestion, which to our folks was entirely new, and we were delighted with the tasty product. It is true that these biscuits called for only slight quantities of potatoes; however, I firmly believe that many novel ways might be devised by one employed by The National Potato Growers' Association with the consequent result of an appreciable increase in the consumption of potatoes.

It is the natural tendency in a discussion on publicity and advertising to lean toward co-operative methods and to make recommendations for large associations, because it is there we picture the greatest possibilities. I must talk to you, however, with the thought in mind that a large part of your work is done in sections where the grower disposes of his product in the local markets. When shipments are made to the large city markets for distribution through a commission merchant, the grower or association might think that the possibilities for advertising his or their product is greatly reduced. Such is not the case and I have the knowledge of numerous profitable methods which from their beginning have been inexpensive, modest and profitable.

The Eastern Shore Farmers' Exchange, with offices at Onley, Va., has established a large reputation by their trade mark of the red star. The red star brand potatoes are known by every buyer on the city market and that brand or mark stands forth as evidence that the white potatoes or sweet potatoes contained in that package have met the requirements of their particular association. Individuals in turn from the New Jersey section have in several instances established a trade mark by merely painting the rims of their baskets. I have in mind one grower who paints all rims blue and then stencils his name over the blue paint with black paint. Another grower uses red paint. These two marks have been recognized for several years on the Philadelphia market to designate a high standard product. In many instances the result has been that a premium over the regular market has been secured and in many instances when the market has been glutted these brands selling at market level prices have sold more promptly while other good not trade marked have rotted at the stores. This same method is being used by an extensive grower of potatoes in the Norfolk section who paints the top rim of all barrels red. This mark carries a certain identification and gives the message assuring the buyer that the grower of that product furnishes his guarantee of a straight and honest package. I find in every instance where the grower presents his name and guarantee before the buyer that the package carries a certain degree of pride and that the grower is endeavoring to meet the requirements of the city merchants on an honest basis. This fact is realized too by the produce.

Attractive labels placed on each package have proven their value many times over. When the farmer is placing a crate of strawberries on the market or when he is marketing his crop of potatoes or whatever the produce his name should be identified with that product. If the goods give satisfaction to the buyer it will mean further sales. In every line of manufacturing we find that the manufacturer claims that the profits lie not in the first sale to any customers but rather in the later follow up orders. It costs money to secure new trade. If the customer is satisfied with the first deal it should be the business of every man to clinch that trade and to secure every succeeding order possible.

Sales of strawberries from Bustleton farms have been made in different sections of the State and to new customers of whom we had never heard but they had found these berries to give satisfaction when they made the purchase from the neighboring store. They would never had known where the berries were grown had the crate not been labeled. The label bespeaks a certain degree of character and individuality.

An experience which I have related on numerous previous occasions is that with potato growers in Lancaster county. A few years ago when soliciting consignments of potatoes in that section, I found certain growers with a good quality of potatoes who were packing them honestly and grading their stock carefully. They loaded sometimes with their neighbors who had an inferior quality of potatoes in order to secure the carlot freight rates, the result in many instances was that the farmers received like returns; the producer of the good stock securing a small return which had been made by averaging his product with that of his neighbor. We suggested to certain of the growers at that time that they tag every bag of potatoes shipped; one side of the tag bearing this statement, "Grown and packed and guaranteed by John Blank, Peachbottom, Pa.," and on the reverse side of the tag the name and address of the commission house. It was found that this idea interested the growers and stimulated the grading of their potatoes more uniformly. He took apparently greater interest in preparing his shipment because he realized that his name was at stake.

In every line of business we find that the trade mark and the good will are great assets, sometimes the greatest in the possession of manufacturing concerns. I believe that it is possible for the farmer to establish a good will from a trade mark that will furnish an asset proportional in value to that of the manufacturer and probably greater in value than his entire farm equipment.

A BRIEF REVIEW OF FARMERS' INSTITUTES OF 25 OR 30 YEARS AGO.

By W. H. STOUT.

Our good friend and brother, Mr. Bond, found it necessary to return to his home on business matters that required his presence there to-morrow, so he requested me to take his place. I objected to it because I cannot take Mr. Bond's place, we only have one Mr. Bond in the State; and while I am a sort of a substitute and started in this work about the same time he did, I can give you some of my experiences that may be somewhat the same as his were; and to-day, when I was sitting idle, a few thoughts suggested themselves to me.

Before touching upon this interesting work, a few introductory remarks will be in order. You know that is fashionable among prominent speakers, to have a few introductory remarks. (Laughter). Now I had to put this down in notes, I couldn't get anybody else to write it, so I had to do it myself, and this is a little hash, you know, previous to the feast that we expect here.

I feel at home here among the staiJ, steady and conservative Pennsylvania Germans, in what is termed the pie belt, where we have that nourishing delicacy three times a day and before retiring. It is amusing to associate with such persons as come from other sections where the buckwheat batter is never wanting from October until May and where boiled squash is the one vegetable most highly esteemed. To see those from Prohibition sections advocating free love and woman suffrage and pose as Prohibitionists at home, devour the good old-fashioned mince pies in the rural communities when the pies are spiced with good brandy or New England rum, is simply surprising. This section is noted for its industries and progressive agriculture. However, while many of those assembled here have not visited Schuylkill county where the most scientific agriculture is carried on in the State, it would be well to spend time to visit the valleys surrounding the anthracite coal field to see work of practical scientific expert farming. Being progressive it is proposed to advance to higher stages in having a county agent employed to tell us more about balanced rations, germs and bacteria. The farm products find markets in Schuylkill county where all the crops are demanded to support the vast army engaged in the mining district where nothing intervenes between producer and consumer except the tail board of the market wagon, as practically everything the farmers produce is delivered from house to house. While generally contented, we meet with afflictions and visits of diseases to which animal life is subject, like hog cholera and aphthous fever, also human epidemics. Over the tail board of the market wagon, we exchange commodities and money, get all the money we can for the least possible goods, and the high cost of living does not enter into the question.

Now on this question of Farmers' Institute work and early recollections, I want to call your attention to a few names that occurred to me to-day as having been among the first engaged in this work. Here we have for instance, Mr. Bond, Mr. Snavely, Mr. Heister, Mr. Cooper, Mr. Grundy, Mr. Frear, Mr. Freas, Mr. Waters, Mr. Armsby, Mr. Sisson, Mr. Northup, Mr. Stitzel, Mr. Fox, Mr. Critchfield, Mr. Garretson, Mr. Searls, Mr. Woodward, Mr. Schock, Mr. Philips, Mr. Thomas, Mr. Vallersham, Mr. Campbell, Mr. Tewksberry, Mr. Heiges —these are some of the names I remember as having been engaged when I first started out in this work as associates, and I think that covers most of the speakers at that time. I found out during my experience in Institute work, that people listening to these speakers don't regard the use of high, fluent language, they don't appreciate the use of Murray, Smith, Kirkham and Quackenbos English so much as they do the facts. They are like Dickens, they want facts, they don't care about the English sometimes handed out to them in long sentences.

Now when the Institutes were first introduced, it was under the old administration of the State Board of Agriculture, when Secretary Edge was continued Secretary for several terms and I became County Chairman when they were first introduced in our county, and continued in that office for quite a number of years, 16 I think, and when we first attempted to hold Institutes we did not meet with a very cordial reception. I remember the first instances right in my home town. I worked it up, and when I went into the hall to open the meeting, I saw a few farmers standing on the other side of the way, on the boardwalk, the sidewalk, and kind of peeping out behind the trees, looking across the street to see what was going on, and we had a very slim attendance because of this fact. We had a lot of people who were trading on the credulity of the farmers: For instance, fertilizer agents, agricultural implement dealers and others who were dealing with the farmers; they tried to make the farmers believe and often said—I overheard it—"Why, we can't learn anything from those fellows, they are only book farmers, they are not practical farmers." They discouraged it for some years, but we spread the gospel continuously and after while we got more interest aroused.

I remember also we couldn't find a single hall to meet in; the church was denied us because farmers objected to having anything in a church outside of religious services, hence we had to convene in any place that we could find. I know of three instances, one in Lehigh county, where we met over a hotel barn, and where the manure had accumulated and was stored down below. At home we experienced the same thing in our county, we could not get any suitable hall, so they put us in these livery stable lofts, and in one instance, we had a similar situation, an open shed; the floor was cold and they brought in some beer kegs from the adjoining hotel and some slabs from the saw mill and made seats for the audience to sit on. Those were very discouraging beginnings. Of course we kept on working it up gradually, and we finally succeeded in getting larger audiences and more interest.

Then the Grangers became active; we had some of those speakers who were Grangers come in there and advocate the Grange. Then they organized Granges, and since then we have had better success with our Institute, but those were some of the discouraging beginnings, and of course we worked it over those fertilizer dealers or agents; they were a problem. I remember the time very distinctly when plain South Carolina rock was sold in my home community for $24 to $26 a ton. The analysis showed about 10% or 12% phosphoric acid, worth $12 or $13 a ton, just doubled the price on them, and those fellows discouraged the Institute.

I don't want to consume your time; these are just a few reminiscences of the beginning of the Institutes, and you know what their success has been since then. At this time, however, we were permitted to select our own speakers. The County Chairman could pick his speakers for his own Institute and we tried to select speakers for our community suited to the occasion, fruit growing and other things in which we were engaged. We tried to have men discuss those along with a few scientists from the College like Frear, chemists, etc. So that is about my experience, and I suppose that some of you who started in this Institute work about the same time had the same experience. Now we are allowed to go into churches and Grange halls, where it is a pleasure to meet audiences.

The CHAIRMAN: We are now to hear from one whom you are always interested to listen to, Mr. Seeds. (Applause).

MR. SEEDS: Mr. Chairman: I want to thank you for that applause, ladies and gentlemen, because applause to a public speaker is like sicking to a dog. Talking about Community Building, as I said yesterday or the day before, I would liked to have talked on that question for a few minutes after the gentleman had gotten through talking on Community Breeding. Now I did not expect to wait until this hour to get an opportunity to make the few remarks I wanted to make at that time.

But talking about the Institute work—years ago, I guess I am the oldest man in the work now, you understand, as a section man in Pennsylvania. If there is anybody else doing Institute work that is an older section man than I am, I don't know who he is. This thing came about in a very queer way. A few years ago I lost myself. went down to Philadelphia to see the doctors and they told me I had diabetes and I'd better go home and fix up my financial affairs; and I went home and Mrs. Seeds began to talk about what she and her second husband expected to do and I made up my mind that I wouldn't die, and strange as it may appear, I came to this town. On this street, within two blocks of this place, lives the man from whom I bought the old, abandoned and worn-out farm I own, the man who held the mortgage and got the farm at the foreclosure of the mortgage, and I came down here, bought that farm from this gentleman and moved on it that hadn't had a man on it for seven years. Can you imagine the condition of that farm when there hadn't been anybody on it for seven years? Can you imagine what it would look like? Can you imagine Mrs. Seeds and myself moving from Tyrone, out of a home we had built to our own pleasement, with a bath room, toilet room and all the conveniences of a town like Tyrone, and going down on to that old worn-out and abandoned farm? Mrs. Seeds cried when she went into that old farm house. She knew what was in that house better than I did; (Laughter) and I am not here to say a disrespectful word about anybody or anything, and when you cannot get the sunny side out of a proposition, there is no use in some of you fellows trying, and I am not here to say a disrespectful word about a bedbug, but I don't like the way he makes his living. (Laughter).

Now that was the old farm that put me on the Institute platform. That farm began to have a different appearance from what it used to have and Secretary Edge invited me to different places to make speeches. I have spoken at a Farmers' Institute when they brought in the beer kegs, empty beer kegs, (laughter) and turned them on their end and put planks on there to hold the meeting. I have gone into counties when they went down in the store and got the grass out of the crate the dishes were packed in and straightened it out and brought it up and laid it on the desk at the Farmers' Institute and wanted us to tell them what kind of grass that was that was taking possession of their community and cattle wouldn't eat it. They were afraid that grass was going to run them out of the county. I went down to Montgomery county when Mr. Martin gave me the First Section, and the first thing they did was to take me off to one side and ask me what I had done along the line of politics, that they were paying me for doing something for the machine, and they walked away like lambs when I told them that I was a Democrat and there was no collar around my neck and the man did not live who could put one around it. I faced all these things and saw the improvement on every side; I saw the improvement from here to Nebraska along the lines of agriculture, and I have been proud to see the farmer come to a place where he is no longer being called a "Rube," and I am glad to see everybody taking their hats off to the farmers of this country. I think the proudest hour of my life was when I was introduced to 900 bankers in New York City and everyone had an evening suit on with the same kind of flower in his coat, and I made that duffer introduce me to that bunch as a farmer, and that is the way I stand from here to the Coast. I want them to understand that I am proud that I am a farmer.

That man day before yesterday talked about Community Breeding, and I wanted to follow that man at that time and change it around and call it "Community Building," because I have been at that all my life, and today, if I was to sell that farm, which Mrs. Seeds cried when she saw, if I were to sell that farm, I don't believe Mrs. Seeds would sign the deed; and I have got six children who would sit down and bawl their eyes out if I'd sell that farm, and I have got a right to say something about community building. At Madison, South Dakota, three years ago, on the Fourth of July, they invited me out to their Chautauqua. I went out and talked to them on the "Mistakes of Life"—on the Fourth of July; and last July they invited me back again and my subject was "The Influence of the Home," and I spoke to the largest crowd I ever faced, on that subject. And without any preparation I stopped talking about "The Influence of the Home" and started in to talk about the influence of the hog pen, on the afternoon of the Fourth of July. Why would I do a thing of that kind? What would make me do it? Simply because I had gone out there to the Chautauqua for the afternoon of the Fourth of July, and sixty days before that time I had lived in a hog pen, spent sixty days in a hog pen, and the reason I talked it was because it was in my system, I had lived it in the last sixty days, and I began to talk the hog pen to those people, and I told them I had built the best hog pen, finished the best hog pen between Pittsburgh and Philadelphia with sixteen departments in it, with sunshine and ventilation that some hogs don't have, with concrete floors and troughs and running water in every department, and I thought I was thinking about putting in individual drinking cups. (Laughter) And I stood there and told the people that I expected that hog pen, with 106 blooded hogs in it, to have an influence on the coming generation in my community, and I meant it, every word of it.

Now, traveling from here to Nebraska, I go through communities out in the West where the people of this country go there and pay tribute to that community because they have been building that community in the past, and I have sat down there and watched men with overalls on make a public sale bring $26,000. Not only that, but I stayed over there and in two or three days attended other sales in that community and said to myself, "If those people can build a community like that, why can't I do it?" How did they do it? Durock hogs, Berkshire hogs, Holstein cattle. No man ever wore a white collar raising a razorback hog, he can't do it; there is an eternal fitness of things that goes with all these things, so I made up my mind that I was going to help to build my community by better breeding. I went out to Ohio and I looked around to buy some cattle and I made up my mind that after traveling over this country, that the Holstein cattle had the boom in this country at this time. Now, if Howe was here, he would say I was crazy. I didn't buy the Holstein cattle because I liked them better than any other cattle; I bought them because they had a boom in this country and I wanted to go with the crowd; and you can take any advertisement in Pennsylvania, I don't care where you find it, any company that wanted to advertise anything, they use the picture of a Holstein cow. Show me one, if I am mistaken, showing the popularity of that breed of cattle, not because I like it, but because the people said it was a good thing, and I went out and brought a lot of those cattle into my community and I turned around and began to talk it. Since that time we have got two men in Huntingdon county and two in Blair county with quite a bunch of Holstein cattle.

What am I getting at? I want the man from South Carolina and North Carolina and down in that country where they want blooded stock, I'd like to see them come up to my community and lay their money down in my community instead of going to Ohio to do it. Now if my friend Howe was here, he would say the Holstein milk ain't fit to drink, it's that poor and thin.

Now we have a cow testing association in my community, and my friend Haggerty, who lives at Arch Springs, has the Jersey cow. I will take my lead pencil, corner me now if I am not right—in that cow testing association Mr. Haggerty's best cow gave something over 800 pounds of milk, and she made so many pounds of butter. But Walter Seeds takes one of the Holstein cows we brought into that country, and she had to give between 1,200 and 1,300 pounds of milk in a month to beat Mr. Haggerty's cow. Now I will acknowledge that Mr. Haggerty's cow produced 800 pounds of milk and made so many pounds of butter, and Walter Seeds beat her by having a cow that produced so many pounds of milk. Walter Seeds don't make butter, but he sells the milk in Tyrone at 24 cents a gallon in the winter time. Which cow would you rather have? If the milk stands the test and can be sold on the market of Tyrone, would you sooner have a cow giving 1,200 pounds of milk or one giving 800 pounds of milk, if you sold it by the quart? Now that is a lead pencil proposition with me, and the lead pencil is what cuts the figure in helping to build up any community.

Not only that—when Walter Seeds has a bull calf that he don't want and takes it to a public sale—I think he sold three this spring that he didn't want, little calves, at $50 apiece—you take a cow and she has a calf and you sell it for veal for $15 and the other brings $35 more, how much more is that calf worth than the other, from a lead pencil standpoint? Not only that, but I think we have got about 400 head of registered Holstein cattle—grades don't count—

and I expect to see the day that one man cannot have a sale. But we will go together, not like this man said the other day, but we will go together and each one put up so many head of registered Holstein cattle and advertise the sale all over the country and have people come from other states, and that is the Community Building I like to look at. I like to see a community building that you can stand off and look at it with your eye and see it—I am from Missouri— and then take your lead pencil, sit down and figure it out and see what it is worth and draw the red line and see where the balance is. That is what counts with me, the figuring.

I wanted to follow that man the other day and talk about community building just for a few minutes. The whole thing is to understand the thing in a right kind of way and get the eternal fitness of the thing; like an Irishman that was going to see an Irish girl. He went with her for seven years and at last he made up his mind that he would marry her and went over one evening to pop the question, and when he popped the question, his Irish lady-love said, "Ah, Pat, I can't marry you, I am a dispeptic." Pat says, "The divil you are; why didn't you tell me that long ago? I have been going with you for seven years and you never told me that before." She says, "I didn't know whether you were going to ask me to marry you or not and I wouldn't tell you now if you hadn't asked me to marry you." Pat says, "Oh to the divil with it, we can get married and you can go to your Church and I'll go to mine." (Laughter). So there is an eternal fitness of things and that is why I didn't want to give this talk now, I wanted to follow that man the other day when he was talking on the stock proposition. I believe, as firmly as I believe anything, that good stock, registered stock that is up-to-date, will make better cities, I believe it will make the boys look better and keep themselves in better shape and make a better appearance when they go out among the public. Sure I believe it; I believe it as firmly as I believe anything, and that is community building in my estimation.

I guess my time is up, but I just want to say one more word: Charley Waple, of Tyrone, is selling to the young people of Huntingdon, Berks county registered gelts, all pure bred, and giving those boys and girls a premium of $25, $30, and $35 for the best sow and the best litter of pigs next fall, and I had the cheek to tell the Board of Trade that Charley was doing more than anybody else in Tyrone to build up that community. Is one of those young men going to a shoemaker's shop to get his hair cut when he takes that sow to the fair? Not on your life. He will go to Hollidaysburg and have his hair cut and he will have on the best duds he has when he shows that sow at the Hollidaysburg fair, and I believe these things as firmly as I believe anything, and that is the reason why I wanted to make this speech. I would have talked a little different if I had followed that man the other day, but there is an eternal fitness of things; we are here tonight to eat peaches and cream, and I thank you for your attention.

VITAL FACTORS IN RURAL IMPROVEMENTS.

By D. H. WATTS.

While I did not seek a place on this program, I am glad to look into your faces and talk of environs to an habitat with which I am quite familiar. What I say will not be with animosity towards the city life, in fact, I believe there should exist between us, these two classes of people, a reciprocal and altruistic relationship.

Vital factors favorable to and unfavorable to rural development are recognized by all progressive rural people; but how and where readjustment is to be effected is not always first seen by the dweller within the gates, but by the one from without. Seemingly, the vision of the farmer is oft mistified by long acquaintance with his environment and an over conservative nature may hamper his progress. The initial Rural Investigation Commission was appointed by President Roosevelt, upon that board the first place of honor was given to farmer Henry Wallace of the West. Then followed numerous desultory efforts of the city "uplifter" who does not seem to serve as an uplifter greatly, except in prayers of rural folk uplifted to be relieved from the tears of the uplifter; (but that word "uplift" does sound more sweet to the ear of the sluggard than the word "reform"). Well, in the findings of the Roosevelt Commission, we were told that country life needed some readjustment—that the great trio of educational agencies, the home, church and school were out of harmony with the world, needed tuning but no tuner, no panacea or cure-all was applied.

My friends, the home where you and I were born, where the children linger at mother's knee, where they play, eat and sleep, is the great vital factor of any community; next to it the educational plant of the farmer. Let me quote the words of a few of our educators. First, of Dr. Hunt, former Dean of Pennsylvania State College: "I hold that any system of education is faulty that does not permit boys and girls of 14 to 18 years of age to sleep at home, any plan of education that breaks up the home life at this age is not ideal. This has been the contention of the speaker before you for years. I call it rural suicide. And with this home breaking what a sadness and a flood of tears, what an untimely expenditure of money."

Prof. Clinton, educator of Connecticut: "Never will any method of instruction or sending out of specialists bring in a better age for the rural dweller. The farmer may thereby get more dollars, but he will then rent his acres and move to town to better social and educational advantages. The boy and girl of the farm, has as good a right to these advantages as the city boy and girl; but those community blessings must develope if not bud in the rural environment."

Another Dean of a college says: "The little rural school and its work where I obtained my early training is no more efficient than it was thirty-five (35) years ago."

Hon. M. W. Hays, of Washington, D. C., says: "The little one-room school must become a four-room consolidated plant, so that a man trained in agriculture and a woman in home building, may here find fair wages and a friendly co-operating spirit among the patrons of a school of one hundred to one hundred and fifty students."

This is a brief word picture of a few such schools in Pennsylvania of which I shall later speak. Such as we should possess in numbers to accommodate all the school population, training in a sane and economic way, the 95 per cent. of children now receiving no secondary education. I have looked up the words of more than a dozen educators of large institutions of not only our own State and others and their concensus of opinion is the same. Yet these men are all, mark you, every one of them boosters for their own respective institutions in the United States.

There are sixty-seven State Colleges and fifty Experiment Stations, numerous other colleges and State Normal Schools which are zealously boosted by thousands of school officials and teachers, with millions and millions of dollars of property value and appropriation. In Pennsylvania alone we have a State College and numerous other colleges and thirteen State Normal Schools secured by boosting, and, sometimes, lobbying. From these institutions with all their retinue of itinerant educators bringing seasoned and sweetened fragmentary knowledge we are expected to be patient.

What is the situation after all of this education at the top instead of at the foundation. When I was a small boy 85 to 90 per cent. of our people lived in the country; now but 47 per cent. are on the farms. What have we done? Educated away from the farm. We need the buoyancy of good home grown educational plants. This little sprinkling of distant schooling reminds me of the boy at play who trys to satisfy the aquatic majesty of a goose by playing a stream on his back with an alder squirt gun, he needs the buoyancy of a real home pond. Home institutions are what we want with boosters and lobbyists back of them too, if need be, where the children get the fostering and developing care of the first school years and up through the secondary education as is and has been done in France for years. We are trying to educate all the while without proper foundation and building at enormous cost to the few who are educated—while 95 per cent. of our rural population are devoid of High School education, even a good common education as the fans of ball-field and store box loafers will show; multitudes, if you please, who care little for reading matter and less for learning a trade. This, my friends, is the fruits of our sowing.

Now to a few figures. We have, I am told, 4500 townships in Pennsylvania, and from these, counting six students from each, is sent annually to distant schools at an expenditure of $300 each, or nine million ($9,000,000) dollars. With this goes a goodly sum to common carriers, railroads, etc. Now does this not look like rural suicide? We farmers then pay a home school tax and a distant school tax, a double school tax. We are like the fellow who went from Chicago to Philadelphia to get good distant religion (Billy Sunday kind), his railroad fare was $50.00, his hotel, $10.00, and his Billy Sunday fee $10.00. Yet when he got home his religion was only skin deep; but it cost him more than he contributed to his Chicago church in a decade.

Last fall I happened to be in the town of one of those mobilization camps or schools with its acres of buildings, where hundreds of farm boys and girls are sent and where I spent a few months, 33 years ago. This was in the evening, on a vacation day, and all was quiet, and, luckily, I met at the gate a faithful old teacher who still lingered in the service. She said, "Why, Mr. Watts, I am so glad to see you, and how long is it since you were here?" I said, a long time indeed. She then said: "You have seen this building and that, and that landscape view and do you see the magnificent large five-story building we are finishing over there and you should see the beautiful changes and furnishings inside; come in." Well I went in and saw the place, one of the great, fostered, boosted plants that shelters hundreds of farm boys and girls who do not "sleep at home;" one of the rural suicide plants boosted by a multitude of people, some of which are beneficiaries.

But, who are boosting our little rural schools, our little orphan institutions receiving less appropriation, because of thinly or sparsely settled territory? Oh, yes, some County Superintendents defend the ungraded school in its bramble setting. One recently in a public address said: "Nearly all of our successful business men of city and town came from the little red school house." He is right. But why did he not mention the greater number of rambling inefficients who emanated also from its doors; the speaker before you, for instance. I, like so many others, lack that all important fundamental training. Well, do I remember my struggle in mathematics. I came to denominate numbers, concrete numbers, complex numbers and then to confused numbers, and then I quit school. Now, that same man who was lauding the little ungraded schools, said: "Yes, I know twenty-five teachers in one city who are successful; they came from the little one-roomed school." He must have meant to say, they developed finely in the country in spite of the little school. The superintendent did not say, however, that the city and town now decree that they will not hire a teacher until he or she has taught three successful terms of school, where usually in that little experimental school, was the stepping stone and passport to other things. This reminds me of the fame of a certain colored doctor who was approached by a young man of his own race, thus: "Rastus, I say you is de most wonderful doctor I ever saw, you sure never make anybody feel sick or mean or kill them wid medicine." "Wol," said the doctor, "it is this way, I is most wonderful careful of my people and when I expounds and ascribes medicine, I always gives de fust dose to de dog, if the dog comes out allright, den the patient gets it." Those twenty-five successful teachers in the city, gave we farmers the first, second and third dose and then went to the city at higher salary.

Why is it that the farmer naps while our city friends make the school code. (A garment to fit anybody anywhere), makes the curriculums, names the salary. the length of term and the size and scientific qualities of the old drinking bucket, tin cup and stove, and next year how to pack the lunch of the school child. How many men and women in this audience had a hand in the architectural design of our recent school code? Do not all speak at once.

We, as farmers, give up all, trust all to others. Like a bunch of sight-seers in a secluded spot in Yellowstone Park, when held up by one lone highwayman, after he relieved them of watches, money, etc., one thoughtful tourist, a farmer, in a trembling voice, said: "If you are going now, here is my umbrella, you might be caught in a storm."

As a farmer, I for one am ashamed of our inactivity along the line of improvements so vital to our welfare; why is it so? We have a goodly number of rural schools operated to the interest of their people, one such is at the crossroads village of Elders Ridge, Indiana County, a combination High School where agriculture and Manual Training are taught, cooking, sewing, iron and wood working. Think of it, 86 students at an educational plant in a city of houses that can be counted on the fingers of your hands, all getting the very sort of an education they need, and, in the words of Dean Hunt, "All sleep at home."

Now a few figures. The suicide price of a year's schooling away from home is no less than $300 per annum per student. Then there is saved to Elders Ridge and the nearby townships yearly, 86 times $300 or $25,800, which, if added to carfare and incidentals, would amount still much higher in distant education, nearly as high as distant religion.

I have named this one sample school to show what can be done locally. And if I had the power I would return the thousands of the previous boys and girls of tender years from the distant-over-crowded State Normals and Colleges to their rightful heritage; a plant like the one mentioned, where they would enthuse and enliven the home and neighborhood life, would afford an organist in the country church choir on Sabbath morning and fill the old church structure from the door to the Amen corner with the very ones who are now drifting hither and yon. Yes, the school and church are Siamese twins, cripple one and you wound the other. Both are vital factors and both must grow and be nourished from within, not so much from imported enthusiasm, however kindly it is proffered. A wise man has said, "He who would succeed must be his own most severe critic." So let us turn the X-rays on our own community and if possible determine what vital factors are being neglected; why the stagnation in the church, the school, the roads.

I should take time to talk about the road from my farm that stretches over the hill to Rambo Lane farm and thence on having no end like time itself. These roads are as important to rural improvement or advancement as the veins of our bodies are to our life. Then why do we so sadly neglect the dirt road? I hope that the day will soon come that the road laws of our State will be mandatory and say you *must* crown your roads on or before a certain date, not later perhaps than May 10 and you *must* remove the loose stones from the roadbed, etc.; simply a passive suggestion is too mild for most of us, and thus the good intentions of our road authorities are rendered abortive. Co-workers are we in our work and touch with the farmer, helping him to build to the community in which he lives, or do we heed only the distant "Macedonian cry" in the distance that is not born of need or distress whereby our rural population is robbed, not only of boys and girls, singly and in pairs, but of whole families in quest of better educational and social advantages. After needed country conditions prevail in the existence of real home grown schools and social centers, there will come in the golden day of rural contentment and efficiency. Then those depopulating and devitalizing agencies that now act as a magnet will have lost their power. Then, too, will come the day for the college to fulfill its true mission in teaching along special lines to the many who having been well grounded in elimentary and secondary education at home, now know their talents and bent in life, come seeking the rounding out and embellishing touches of an education yet to be added to young manhood and womanhood, already beautiful by the virtues of rustic beauty and rural honesty. Co-workers, may we do all in our power for the little sparcely settled community that has such gigantic problems to solve, little direct—appropriation tendered and withal has few boosters.

May we all boost the open country interests and the fruitage will be an hundred fold. Yes—this is the message in behalf of the yet innocent boys and girls of the open country who will never hear the tramp, tramp, tramp of the college class or sit among the fans on Commencement Day.

THE SONGS THAT LIVE.

By MRS. ROSE MORGAN, *New York City.*

Mrs. Chairman, Friends and Co-workers: It may seem a bit strange to you who think of me as dealing with songs, to hear me say, and I speak the truth as I say it, that everything that has been said here to-night sounds as friendly as friendly can be. I was educated as a musician and as a singer, yet the years went by and a bigger thing came into my life than any professional work. And to-day I am chief of all, a home-maker and a home-keeper, and in the home there is a Mr. Morgan and it is distinctly not a case of his being Mrs. Morgan's husband; I am Mr. Morgan's wife. (Applause and laughter). But I do feel that in addition to this home-making, there need not be a cessation of things that I care a great deal for, especially as those things emanate from a common experience of Mr. Morgan's and mine; for Mr. Morgan, you may not know and you may care to know, has that rather anomalous work of directing agriculture in the great University of Columbia, in New York City, and his chief business, as he has said many and many a time, is to prevent that idea of uplifting the country people, as a rather hideous and weak-minded attitude of the person who undertakes such work. On the other hand, he says that 80 per cent. of his time and energy goes in New York City to preventing the back-to-the-lander from making a fatal mistake, in that, in most of the cases he is not fit to become a country citizen, and he tells them so plainly. The other 20 per cent. he works with as best he may in his own courses there in Columbia University, in extension work, going out to the people in the city, sending them to nearby colleges of agriculture or to such places as they may be able to go and get steady, good, regulated work.

Now, in all of this, my sympathies are not only maintained towards the country, but I have made a special problem for the last eight years of discovering what kind of songs our county homes, churches and schools are living on; and if we had not had already time taken—but we would not be without one sentence of what has been said—speeches, three or four parts of ones, at least, I should lay a foundation and tell you, because you are interested, what it is that I know regarding our music, songs, particularly in the country home, school and church. But you have been thinking those things too, and so, very briefly, I will say that much that could be safeguarded, clean and good in the country home, which is its own castle, fortified by its own desire to stand high and clean, is not the cheap Broadway song that has crept out into the country, and I have definite data that the country home, as much as the city home, revels in the cheap ragtime song of to-day.

What is that song? It talks about the girls on Broadway and the music with the meals and the father and mother—the father's a Governor and the mother's mam; the two are necessary, but they are not to be minded over much, just more or less tolerated. And the young people, oh! they make love at midnight and must not take life too seriously, it all passes off, you know, and if it does not pass easily, the divorce court takes care of it and you can begin all over again. Eighty per cent. of our popular songs deal with love of the cheap, not holy variety, with a ragtime chorus, and everybody is singing it.

Now in the city—I must make this brief—there are literally hundreds of thousands of dollars spent for free music to offset that kind. But the country boy and girl, to my definite knowledge, gets hold of what is called the latest hit or the latest best seller and he keeps it as a treasure in his home, sometimes for three years, grinding it over and over and over, never realizing that that thing ran about three weeks in the city and then died out. Why? Because it did not have strength to live. It is a thing that never should have been born; it lived just a little while and died out and made room for the next cheap ragtime song. Now, if you can say to me, as brother to sister and friend to friend, and worker to worker, "Mrs. Morgan, we haven't in our community a single bit of that cheap ragtime music, we have only songs that live," then you don't need to listen to the scolding part, the preaching part of my talk. But I have not yet, and this year I have given six hundred talks or lectures, as they call them, in nineteen different states of our Union, at eighteen different State farmers' meetings and at a large number of Farmers' Institute meetings, and in not one has somebody stood up and said, "In our community, to my knowledge, there is not one of those cheap songs." I am not expecting that. I have had women and men say to me, "Mrs. Morgan, there is not such a song in my home," and I dare say some of you can say that now to offset that. I feel, as Mr. Seeds said, that I have had such personal experience as a child, a girl, a young woman and now a woman of middle age or getting toward that—I have had such personal experience in the songs that live that I am going to, without apology, tell you my own story, not because it is a new story—rather the opposite, because it is a story that you can parallel, many of you, in your own experience, and say, "Oh, I have a song too that I learned at home and I shall never forget it." My friends, I should not be here to-night if I did not feel in our country homes—I think of the town and to-night the country and most of the nights the country—in our country homes, the danger to-day is that the child will go out and become 21, become 35, become 40, become past middle age, become an old man or an old woman and will not be able to say, "I learned that song at home," for the cheap ragtime song will die in a year or two and the song that lives is not being taught to-day.

Why? We are living too fast. A professor at Cornell said that one of the greatest menaces of our country people to-day is the fear of not being up-to-date. That's all right. We want to be up-to-date in the city, but not with the city rottenness. When we sing, close the door on the song that talks of filth, and 80 per cent. of our popular songs talk it; the boys and girls know it but the old people, or the father and mother not old, not even middle-aged, some of them, think, "Oh, well, you know, they have to live in the present, they have to do what the people in the present do." That is all right for clothes, even though they are almost indecent, if you say so, that is all right for furniture, it is all right even for foolish walk and foolish dress and habits and all that, they are simply on the outside and can be laid off. Certain influences can wipe off the bad of them, but what is the song? It is the expression of the heart, and when a boy sings of an attitude toward love that he would not say in words to any young woman, but when it is put to a tune, he will sing it, he opens an avenue for cheap and evil logic; and my own brothers have said so—college men have told me, farmers have told me, every type of manly occupation as a community builder has told me that the song nowadays is not regarded as a great character-builder, as it used to be.

Some of us do care so much though that we speak of it and you respond and listen to my story, which is very personal, because, as I said before, it is your own experience. My home is in Wisconsin, and there I was born and there six children of us were born, to a very humble, as the world saw them, father and mother. And yet my word for it, I never knew so great a father nor so great a mother, because it was my father and it was my mother, and I remember the things they did during all my life from babyhood up, to prove what a good father and a good mother can do and will do for the child while it is their child. One of the great things, as heritage for me and for my five brothers and sisters, is this mother and father taught us old songs, songs that live, and to-day the six children of us—though one we say is dead, but she still lives—the six children of us sing those songs. Why? Because they are historically great? Not at all. They are historically great; the world says they are great songs; why do we sing them? Because mother and father taught them to us and we live over again the child days and the songs we learned from father and mother in our childhood are great enough and good enough to sing now that we are middle-aged and we are going to refer to them. When I go home at Christmas, as I always try to do, about the first thing I do after greeting those in the home, is to go into our little sitting-room and open up a little wood cabinet about 3 or 4 feet tall, and that is our family treasure. My father was a pioneer from Virginia through Ohio and into Wisconsin. Mother was a pioneer from New York City west. They were both small when they pioneered, and they and their father and mother before them took no treasure. Pioneers do not take treasure, they take the littlest they can get on with and no more, so that cabinet of ours does not contain the heirlooms such as you Pennsylvania Germans have, does not contain the silver and the carpets and the pictures and the rare old books; nothing of the sort. What does it contain? Family treasure; it contains the old song books that we six children had from our babyhood up, that's all. Yet the six of us, going from home as all of us have, could take anything, it is loose and no one would find any fault, but not one of those song books, by common consent the old home song books stay there, because it seems like the history of our home. Upon the chest will first be mother's song books, next father's song books, Will's song book—Will is now a professor—then Rose's (myself) song book, then Mary's and Charlotte's and Susan's; the whole family all had song books; some were funny, some were serious, but there wasn't a single, filthy, ragtime song in the whole box.

Now friends, my confession; it is not because I was such a model girl, such a fine spirited young woman, that there are not ragtime songs in that box, but it was because I had a father and a mother, and the story is, this father and mother, when I was about 3 years old, did what fathers and mothers will do, looked at me and studied me—I was the oldest girl—and said, "What is she going to be?" At three years they thought they discovered that I wanted to be a musician because I heard a woman playing a piano and went home and taking my mother's song book to the window sill, my mother found me playing and singing with all my might, and mother called father and said, "She is going to be a musician;" and my mother said to my father, "Will you stand by her and help her get an education in music?" When I was sixteen, the same father and mother had another little conversation in our western town. "She has gotten all the music she can get," and decided to send me to Boston, which some people don't call a place but just a state of mind, and to Boston I went to get a musical education, and when I came back I had a very great change—musically, just a little bit; I had a Boston air settled all over me, which I had cultivated with very much effort, and everybody was made to feel, "Now I am just a little wiser than my father and a great deal more up-to-date than my mother, so look at me and I will stand for the family."

But my father wouldn't have it so. He was a hard-working man, being a contractor, he worked hard all day and was in his office all the evening, so as to get double wages for the family, and mother never was through, day or night, and so when the high school boys came to call on me, the first week, I didn't realize that father and mother had grown grayer because I had been sent to school, I felt it was too bad, "but I'll step forward and show them what the world is like, and father and mother can stay in the background." They ventured to ask me to sing, after I had shown them my Boston air. "Oh, yes, I'll sing, and I stepped to my little home instrument, spread out my music, and began to sing. The song I sang told about a young lady and a young man who were in love with each other—that is one of the greatest human experience, and when a home is the result, it is, I think, the greatest, and this story said they went to a dance—now a dance may be all right, but it has got to be a sensible and guarded thing, and at the dance the young woman discovered there was another young man on earth besides the man to whom she was engaged, and then came the chorus, "After the ball is over." How many of you remember ever having heard that song "After the Ball is Over?" Well, I am glad of it, you and I are more nearly of an age. How many never heard it? Hands up. I see. Well, very few of those who are old enough and those of you who haven't heard it very likely are those who simply were not living at that time where it was sung and I can hardly think where that was, but I congratulate you if you don't know the song. I sang this song and then something happened, and this story is the kernel of my experience in song provision for our home.

I heard my father's step inside of the house. Now you know sometimes your father can walk one way and sometimes another, and this time my father stepped that other way, and he had been smoking on the outside, on the porch, listening to his daughter sing, the one for whom he had worked hard to send her to Boston, but my father was not afraid to be the father. The room was full of high school boys and girls. In came my father; "Daughter, what was that song you sang?" "Oh, father, that was the very latest, everybody sings it. Don't you think it is perfectly charming?" My father simply took the music and put on glasses for the first time. Fathers who work days and nights are likely to take to wearing glasses soon. He read the words all over as though he distrusted his ears, and then he turned to me with a little look and without a further word, he stripped that music this way and this way and this way and crosswise and put the pieces in the little fireplace back of us. My Boston air and I walked out of the room. My father walked out too. He didn't say one thing, however, until Sunday.

On Sunday, you don't care for all he said, but he said three things I never shall forget and I must pass on to you now. One thing was this: "Daughter, if that kind of song is the only kind that you are going to sing in the old home, you need not sing any more." "Daughter, if that is the kind of song you have been buying while you have been away, you need not buy any more songs without your father's direction." "Third, if that is the kind of song you are learning back in Boston, you need not go back another year." Oh, I almost hated him. I simply felt "poor, old fogey, way behind the times, hopelessly out of date;" but I didn't say so. That night my father, who was truly a religious man, didn't want the sun to go down on his wrath, and this is what he said: "Daughter, until you can use better judgment, father must stand in judgment for you." That was all, and I never can forget it. I was not converted by it at all, against singing the songs that said, "Don't take life too seriously, make love easily, the divorce court is such an accommodating institution and you will be taken care of and you can try again," the substance of that "after the ball is over." When I was about twenty, nearly that, I was helped to go to Italy to study, and there I had my first great lesson that the children who learn good songs may come, as they do, from Italy over here to get rich, they will take

American slang, American clothes, American everything; but when they come to sing a song, they will sing a song of their own childhood. And on the ship going to Italy, there were 1800 in the steerage, those 1800 thought they saw Italy and called out "Italia," "Italia." It was only the Azores and they began to sing, meanwhile getting on their clothes, talking the American language, and sang what? The songs they had been earning their money with on the hurdy-gurdy organ? Not at all, the most popular song of Italy, but Italy does not provide ragtime songs for its country or city boys and girls.

Italy is naturally a musical country, and we can learn that much from our hyphenated-Italian-Americans. Call them in and say, "Sing us a good song from Italy and help us to build up our kind," and I want to tell you we have about forty villages and country places in this United States where the Italians are now citizens, depended upon as such, because they have been asked to contribute what? Money? No. Skill? No. They are still called "dagos," still called "guineas." But they have been asked to come into the community songs and contribute and they contributed so many songs of the type that people like that we have accepted them as song-makers, song-builders, and the most popular song of Italy is this little home song that I am going to sing to you.

Why do I sing it? Because you will hear it and hear of it always from now on. It is an adopted American high school song brought to us from Italy as a contribution, the most popular song of Italy. The first stanza says, "Saints of light, welcome us home, we are homesick." Is there anybody here who does not know what homesickness is? If there is, perhaps you won't realize why this 200 years old song of Italy should have lived and now become one of the Italian-American songs, a gift from Italy to America. (Mrs. Morgan then sang the song in Italian).

Then they dance, not the fox trot or bunny hug, but a simple old folk dance, perfectly clean. If you were homesick, coming to your home town after you had been gone a number of years, whatever your town is, I'd say, "Oh sweet, Oh dear old Boscobel," the name of my home village, and the Italians would say, "Oh, sweet old Naples;" but they do not feel that way so much when they have been asked to contribute the thing they love the best to this country, and that is the song. I sang it in Italian for this reason—I am glad you like it—we are Italians when it comes to singing the Italian songs. Why? We are not singing an Italian song born in some low-down street in Naples and which will die to-morrow, for the dirty thing cannot live, we are singing a homesick, homesick loving song of the Italian people to Italy, born 200 years ago, and it will never die and it is a contribution now to us Americans to help us to build the kind of song we ought to write in America instead of ragtime songs.

But I must hasten on. We are not Italians, at least most of us are not, and we will come back and go across the North water, for most of us have north blood. How many have? How many have Irish? We are proud of it; raise your hands way up; good, I am glad to see it. How many of your have Welsh blood in you? Hands up. They say "Mrs. Morgan, you ought to have Welsh blood." They forget that Morgan is just a borrowed name. How many have English blood and know it? How many have German and know it? That's right, hands up; we are proud of it. You have in your little chest in your home or in your memory a number of songs very dear to you. Are you using them to make them live? We will connect some of the songs all of us know with the boat again; we have to be on the boat—I wish we didn't—to go across the water; and I, as usual, am down below; I don't want to talk to folks, I don't want to eat or smell things. I don't want anybody around me at all; but I do try to get up the last night, that is the night of the Captain's dinner, everybody sings his home songs on that night; so I came up that night, very stiffly, but I stayed up.

Now the boat was the Kaiser Wilhelm der Grosse, and therefore the Germans were asked to sing the first song, and they sang—I am not German, I often wish I had German blood in me, but I know absolutely one reason why the Germans are as they are to-day, pitiful though it is to them and everybody, yet I know they are one man when a regiment begins to sing, and that regiment knows its songs. Why? They learn them in childhood, it is a part of their preparation to become German citizens that they should know the German songs; so, when the Germans sang that night, what did they sing Of course you all know, "The Watch on the Rhine." Did the old people say, "I am too old to sing?" Did the young man say, "I don't know that song?" Did the middle-aged say, "I have gotten over my singing days, I guess I won't sing?" No, everybody, every German on that boat, either sang or repeated the words, and there were something like six hundred Germans. "Watch on The Rhine"—it was glorious. Next came the French; they didn't sing so well, but they sang well the Marseillaise. Next came the Danes, with their country's song. Then came England with—my, what did they sing? Do you know? How does it start? How many know the words, being English, of "God Save the King?" Hands up. Your English blood is more American, isn't it? That's good. Therefore you know the next song we tried to sing on the boat.

The English sang theirs gloriously, and then we Americans, the biggest party on board, nearly a thousand, were asked to sing. What did we know. We all stood up with a good deal of bravery. I did some singing; they asked me to step out in front and lead. I like to look nice—that's the woman of it—and so I asked for the American flag and it was brought for me and they put about us a great, enormous American flag. We started to sing our national hymn, "My Country, 'Tis of Thee." We sang one stanza, sang it well; then we started the second, some started the third, some the fourth; then we started over again and some, not knowing, went back and sang the first over again; some started the second, some the third, and we started again and we didn't agree and we couldn't sing it together and we quit.

I talked with an Englishman on the deck afterwards; he was a polite Englishman and tried to find out—he knew I was chagrined—how I was feeling about our giving up our National Hymn and quitting before we were through, and he said something like this: "You don't seem to take your American hymn very seriously, that is you don't seem to agree upon it;" and other little things like that. I tried to apologize; I said first one thing and then another.

I said, "You know, in England, I lived there a couple of years and I have gotten used to your opening your theatres with "God Save The King" and closing all your meetings of governmental interest, etc., but you know we don't do that way," and then I said the worst thing I could have said, "You know we are a very new country." And then what did he say? "Ay, yes, very new indeed." And then I said, "I will never again apologize to an Englishman for not knowing America, never so long as I live;" and I took a vow that before I went back on the return boat, I would commit to memory the four stanzas of "My Country, 'Tis of Thee," and I would know every word in its place.

Now it is not fair for me to say to you—we are very informal to-night—for me to say to you, "How many here are absolutely certain that they can repeat it or sing it?" And it is very much the same, you know the Bible does not say one word about the voice, it says things with the spirit and with the understanding, it does not say a word about the voice, and if you have the words and the spirit, there is no reason in the world why you should not sing, name over the words or feel them over or think them over or hum them over, but always take part. I won't say how many here can? I will say this; two weeks ago I was in Washington at a Chamber of Commerce meeting, business men's meeting. You would think they were so busy that they never had time to sing or think of it, but when we came to America, it was one of the rare times. One of the men rose and said, "Mrs. Morgan, can't we sing it together?" Ordinarily when I say, "Let's sing America," people say, "The old thing, that's not an interesting song, that kind of drags and there is no snap to it," and that is the way they look; but that man said, "May we sing America together?" Why did he say that? You know perfectly well. It is in the air now as never before, "America, My Country 'Tis of Thee." We are going to sing together, one stanza. I won't say "Will you sing?" I am going to say, "We are going to sing," because we are citizens of this country and I won't insult you by saying when the first chorus sounds, don't ever wait for the minister or your leader to get on your feet. We never sing America sitting. Sometimes we have done it because we are a new country and have to learn about it, but we will not do it from now on, whenever we sing America, everybody gets to his feet. Let's sing the first stanza of America. (This was done).

Thank you, I will have that to remember from the State of Pennsylvania, and I want to say to you that with one exception, that where they were all men, I have not had better responses. All men did once all sing; they were army officers and they all knew America and we almost know it. You know where to make good. On the same boat was a Catholic priest; I am not a Catholic, but it makes no difference, there are hundreds of songs that live; the priest said to me, "I hear that you are going across to get the songs of Ireland." I said, "Not altogether, but partly." He said, "Come to my part of the island, 'tis the loveliest part of all the island." Now he was a Catholic priest, who, for twenty years, had been doing good work in the slums of New York; he was going home to be with his old sister; she was expecting him and he said, "Come and see us; Ah, my sister will give you the greatest welcome. Come and see us." "I will," said I. You know we don't stand on formality when our hearts are touched; you can be as genuine as can be, and about four weeks later, my jaunting car driver and I drove up to the old lady's home and she came trotting out to see me. Perfect strangers? Not at all; her brother had told her of me; she was expecting me. She said "Have you heard it?" I almost made a mistake and said "Heard what?" But I did not. I remembered then and said, "Yes, I have heard it." "Ah," she said, "tis the loveliest song in all the island." What was the song? Where had I gotten it? (Mrs. Morgan sings Killarney).

I would sing it all the way through, but you know I must go rapidly. On the same trip, after I had left that dear old lady and the priest, a fine man too was he, I had one more experience, and I want to relate that to you. It was this; The bridge-tender in Dublin—I wonder if he is living now—asked if I wanted to hear the Tom Moore bells in Dublin, and I said, "Yes;" he said, "You know who Tom Moore is?" I said yes to him; inside my own head I said "Tom Moore?" Yes, I knew Tom Moore was a poet. I turned it over. Tom Moore—what did he write? And the old man began to sing. Now you know the Irish can do three things at once; the jaunting car driver could drive his horse and sing a song and smoke his pipe all at once, and this man did much the same thing, only his pipe was bottom side up. He was a little short man, and the Dublin bells, the Tom Moore bells were ringing. Where Tom Moore wrote his song, the old man stood and sang, "Those Evening Bells, those evening bells hold me until their music tells of youth and home and that sweet time when last I heard their soothing chimes. Those evening bells, those evening bells, Oh, ne'er a tale their music tells." Before he finished it, I was singing with him, and when he finished I said, "I know that song, my mother taught it to me when I was a wee little girl." And he said "You must have had a good mother." And we made no more comment about it. (Applause).

I could stay in Ireland, Oh, I could stay there with you if you would stay with me, all the rest of the night. I loved Ireland; I haven't the Irish in me, but I know they were that warm-hearted and kind and full of care-taking and I got a lot of songs. I did get one thing also that I didn't really need. The Irish with whom I lived lived largely on buttermilk and potatoes and I gained 31 pounds, which I hadn't any need of at all. However, I forgave them that when I recounted my songs and realized what a wealth of Irish songs I had first hand, and all the Irish people knew, and how did they happen to all know them? Why, it is an unwritten law; they learn them in childhood. But do our Irish children learn them over here, or, because we are mixing bloods, are they losing the old Irish songs? Can you, as Irish, contribute as the Italians do?

Scotland—if you have Scotch blood in you, you are glad to get to Scotland, as I was. My mother's ancestors were named Kirkpatrick and my father's, Buchanan, so on both sides I am Scotch, and I went first to the home of Bobby Burns, for he is the Tom Moore of Scotland, and I went to Dumfries, where, as we say, he was buried, and there I learned the history of Scotland's greatest song, I think. What was the history of it? It is a little story that runs like this: I was traveling all alone; I promised my mother I would go to the same line of hotels so as not to miss the mails, so

I was traveling the line of the Kings Arms Hotel, and so all I had to do was to sit in the buss marked that way and watch the people, and if you watch the people long enough, you will generally see something interesting. Two people came toward me, a tall lady and a wee little man. By certain signs which I thought were correct signs, I said to myself that they were husband and wife; she was bossing him and telling him to do this and do that and he was minding her; and I said, "He is not an American," but I couldn't think what he was. They talked a tongue that I couldn't locate.

Finally—he was, he was on the step and she was inside, and they started to the hotel and I didn't expect to ever see them again. Finally I was in my room and the man came up and said, "Won't you come down and have a cup of tea with us. I went down and there sat the tall lady and the little man; and finally he said, "Will you have a walk with us?" We started off to walk, the tall lady and I, and the little man followed and we walked and walked and walked, and finally we stopped—I learned afterwards it was six miles—when the tall lady stopped and I stopped and the little man stopped, and the tall lady turned to the little man and said, "Sing;" and of course he began to sing, and I wonder if you know what the song was that he sang? She said to me "Do you ken where you are?" (Do you know where you are?) I said "No." She said "Have you ever heard of Maxwelton?" I said, "Yes." She said "Yon, is Maxwelton;" and she pointed to a little church and said, "About 28 years ago he and I were married in yon church and we went to Australia and we have not been back, but just now to put our two sons in Edinburgh University, and we could not return to Australia until we came once more to Maxwelton. It is the loveliest spot in all the world. The Irish would say that Killarney was the loveliest and they have a song to prove it, but she said Maxwelton was and she had a song to prove that, and the little man sang a song of Maxwelton, and when he had sung a stanza, she joined in and then they sang the third stanza, and when they had finished the third stanza and the last strains of the song had died away, I looked at them and the two were crying and holding each other's hands. Finally she turned to me and said, "What do you think of that song in your own country?" I said, "We like it." "You ken you don't."

I thought that was a strange statement, but for once my wits worked and I said, "We think so much of that song in our own country that one of our best poets has said: "They sang of love but not of war; forgot was Britain's glory; we may call it a different name, but they all sang Annie Laurie." "Very well, very well," she said; and then she asked me if I would please go up to Edinburgh and to a certain place in the University and find the proof that the poets had decided that, for three things Annie Laurie should be the type of the world's best love song, which I did; I went up there and they said when they met in Germany, the poets then living, from all the countries, that for three things which are essential, Annie Laurie shall be the type of the world's best love song; First, chastity—that means cleanliness; second, simplicity—that means a song that anybody can sing; third, the proper welding of words and music, Annie Laurie shall be the type of the world's best love song.

My friends, how does that compare with last year's best seller, called "Oh, You Big Beautiful Doll?" How many heard of that song—"Oh You Big Beautiful Doll?" Well, I am glad your hands come up just a little. The song is dead now; it should never have been born; it is dead as it can be. But while it was being sung, what were our young people learning to build up character on for all the years to come? You know Annie Laurie,—we must not stop.

In the same country I learned another lesson; I must give it to you. How many know what the kilties are? Not the kind the ladies wore last year or the ones they are wearing this year, but the instruments they carry to make music, the pibroch and bagpipe and all those instruments. I was invited to the Kiltie Band's concert. I said, "I will come gladly." What did they do? They, in their good nature, provided with much care an American program. I thought they were going to sing Scotch airs. What was the first song they sang for me? They say your sins will find you out, and that first song they sang for me was the identical song which, many, many years ago, my father had taken and torn up and put in the fireplace; they sang "After the Ball is Over," as an American song. I said, "No, no, that is not an American song." They said, "Oh, yes, an American wrote it." I didn't say that he got $85,000 for the copyright, but I simply said, "Nobody sings it now;" and they all laughed at me. But they were Scotch and I might as well have saved my breath. They said, "You ken it is an American song." The second song was like the first, "A Hot Time in the Old Town To-night." And when I said, "Yes, yes, that is an American song, but we don't sing it any more," they laughed and said, "You ken it is an American song and we paid a pound to an American to teach it to us;" and then they played the last song and I applauded from start to finish, and when it was over they said, "You ken we learned that song in Germany." And I said, "I can't help it, that is the best of all our American songs." I think the Germans had taught it to the Kilties as the best American song when they went over there on a two weeks' holiday.

What was that song? I shall refer to it in just a moment. I said, "I am going across the water to get good songs, I am going home, it is time to learn my own country's songs," and I had had five weeks' vacation and I started for home, going by London where the greatest home song that ever was written was finished, and by an American. What was that song?

"Mid pleasures and palaces, where e'er I roam,
Be it ever so humble, there's no place like home."

A charm from the skies seems to hallow us there, which, seek through the world, is ne'er met with elsewhere. (Quotes balance of the song). And that was written by John Howard Payne when he was no longer an American citizen, and that same John Howard Payne, to whom we once said, "You cannot be an American citizen, you have been a traitor," we finally adopted because he wrote a great American song and sent a battleship to Africa to bring back the remains, to our national Capital, where they now lie. Why? Because he wrote the greatest American home song.

I went to London for one other reason, to get the exact words of "My Country 'Tis of Thee," and commit them to memory before I went on that boat again, which I did. Once in the Harbor of

New York, I wrote a letter to whom? I wrote to the President of the United States. I think that was quite a brave deed of mine, or a foolish one, or both. I wrote to the President and said "Mr. President, did you say"—(or something like this)—"that the best of our songs probably come from the old slave hymns of the South?" The President wrote back, "I did," and signed his name. Now wasn't that rather a brief letter? But that President had been nagged almost to death because he had entertained that great negro teacher in the White House, and hundreds of fine ladies had written to Mr. Roosevelt, "How dare you entertain a negro in the White House?" And Mr. Roosevelt, who was the man who signed that letter, probably thought, "Here is another woman trying to find fault with me, and so he said "I did;" but being a woman, I wanted another word and had it. I wrote to him and said, "Will you please tell me how to go about it to get those songs?" And he wrote back a letter at length and told me what to do. Mainly he said, connect with Booker T. Washington; whose name I speak with the utmost reverence. Dr. Washington whose earthly career vanished from our understanding, we will say, last fall, wrote me this letter, very brief: "If you are sincere, I will help you to get the genuine old slave hymns," and signed his name. I wrote back, "I am sincere;" and he helped me all the winter.

I must take but the briefest time, but I must tell you one bit of what I got. He told me to go to Fiske University. How many heard of Fiske University, where the colored people have a high class educational institution? He told me to go there, and let them, the Fiske Jubilee singers—how many heard of them—let those singers take me around; and they finally took me to a camp meeting, a negro camp meeting. How many have ever been to a negro camp meeting? Good. In Wheeling, West Virginia, not long ago, I said, "How many have ever been to a negro camp meeting?" And they said "Huh," as though everybody had been. Just a little while ago I was up in Montreal and said, "How many have ever been to a negro camp meeting?" And not one person put up his hand; they looked blank as if they had never heard of such a thing. But I learned, in a negro camp meeting, how their old songs were built. I was taken to the door by Mr. and Mrs. Work, two people out of Fiske University, left there and told that I would be called for in time. I was passed to the first negro usher; that usher passed me to the next, that usher to the next, and finally I was lead up to the "mourners' bench," the only person on the mourners' bench, and I was left there. The meeting began. Four ministers stood; they all took texts, all announced them and all began to preach at once, and it was truly a case of "the survival of the fittest." At the end of about two hours, three ministers dropped down, continuing, however with this sort of thing, "Hallelujah, bress de Lord," and kept it up so loudly that the last minister could scarcely be heard; but I could hear him and he did what they always do, he turned. When he no longer could talk, his text was turned into a song, and the text was, "Wash Me and I Shall be Whiter Than Snow," the favorite text of the negro, and he turned his text "Wash Me and I Shall Be Whiter Than Snow,"—I was not surprised at that, for his noise had been half singing for the last hour, but I was surprised when that great audience all began to hum the text, humming it all over the church, and harmonizing it beautifully. I did not know whether to laugh or cry, I think I didn't do either, and finally they began to weep and to sway. I afterwards heard they were getting the power, and finally one little lady jumped up, I could see the little bonnet tied neatly on her chin, and she ran up the aisle and made straight for me where I sat on the mourners' bench. When I saw she was coming, I rose and she put her hands up on my shoulders and she said, "Honey, am you a Christian?" Now that is a hard question to put to anyone. We can say we hope we are, but she wanted me to tell and I ventured and said, "Yes, yes, I am." "Praise de Lord, de white girl am a Christian." "Oo hoom," from all the audience. Again she sang it, "Praise de Lord, de white girl am a Christian," and again they all harmonized a little chorus. You notice she took the tune the minister had taken, "Wash Me and I Shall be Whiter Than Snow," "Praise de Lord, de white girl am a Christian."

At 11 o'clock Mr. and Mrs. Work came for me and Mr. Work said, "Have you learned anything?" I said, "I think so." He said, "Now if you could go every Sunday night, the last minister would add his text and keep the original tune; the result would be the winter's folk song, sometimes 50 or 60 stanzas." He said, "Now you thought the song was so strange, because the stanzas are all separated." I said, "it was, but now I understand." The first stanza was the first minister's text:

"Little David was a shepherd;
But he killed Goliath."

The next stanza was the third minister's text:

"Joshua was the son of Nun,
And never quit till his work was done."

The next stanza was the third minister's text:

"I done told you once,
I done told you twice,
There's a sinner in hell
For shooting dice."

That makes a standard old negro song. If you want to hear it beautifully sung by the Fiske Jubilee Quartette, get it as a Victor record called, "Little David," the prettiest, I think, of all the old negro folk songs. Also you can get "Swing low, sweet chariot," "Come for me, carry me home," "Oh, look at the Lord," (singing the song).

What is that? "Ragtime." They say "Mrs. Morgan, is all ragtime bad?" And I say "No ragtime is bad. It is tiresome to hear only ragtime, ragtime all the while, but it is the filthy words talked to the ragtime that makes them intolerable. And let me whisper this, "The negroes give us the beautiful ragtime quality, the words of the forbidding songs are, in the main, written by white people.

But there was a white man who understood the negro, he understood why he liked ragtime, but he never thought of writing dirty words. He came from your own State of Pennsylvania and proud you should be of him. He is our best American old-song writer, Stephen C. Foster, who was born in Pittsburgh, and Stephen C. Foster wrote that third song, of which I told you, that the Kiltie Band played. He wrote a lot of songs. He wrote "My Old Kentucky Home" and "Old Dog Tray," which Abraham Lincoln loved so much, and "Nellie Was a Lady," and "Ole Black Joe." Then I think the best of all his songs was that song which he wrote and told of the "Old Folks at Home," and said in the chorus:

> "All the world is sad and dreary,
> Everywhere I roam;
> Oh, darkies, how my heart grows weary,
> Far from the old folks at home."

Another homesick song, very much as you see, like the homesick song of the Italians. Is there anybody here—what a foolish question—who does not know "Way Down on the Suwanee River?" Who cannot join in on a stanza? I would sing it all, but for lack of time, but we may never meet again; you have some memories that I cannot possibly have; some of you have children, which I have not, and then you have that great experience of which I am bereft, and some of you are singers of long time past and have laid it by for some years, saying, "Oh, I don't sing any more, I have gotten out of the habit of it." If that is true, come back to-night on this best of our American folk songs, "Way Down Upon the Suwanee River." It is like "Annie Laurie." Old people sing it but think of a different name than Annie Laurie, perhaps.

Now I don't think of the Suwanee River when I say "Way Down upon the Suwanee River;" I was born on the old Wisconsin River and I think "Way Out Upon the Old Wisconsin," and you think of some other river, maybe, but we will all sing "Way Down Upon the Suwanee River;" all sing, everybody. (Mrs. Morgan sang, the audience joining).

If there is one place above another where that song is supremely fit, it is the farm home and I didn't wonder when we heard our friend say to-night that he wouldn't sell the farm, that the children wouldn't permit it. Mr. Morgan has said to me "I am so sorry my father and mother looked with yearning toward the city; we children want the farm," and I think of you people as having a tremendous influence with songs like that, because you have something permanent in your home, around which all those songs may be built for the children for all the years ahead.

At Farmers' Week a year ago, a young man came to me and said "Mrs. Morgan, I don't think you like love songs." I said, "Oh, nonsense, if I didn't like love songs I wouldn't be Mrs. Morgan," but he thought I didn't like them because I had been finding fault with the cheap ones. When he asked me, "What sort of songs shall I send to my young lady, you have converted her?" I said, "She wants good, clean love songs:" and I gave him a list of good clean love songs, including "The Rosary," one of the old time love songs. Last August I was in his home at Chautauqua. I was speaking at Chautauqua Lake and we had a tremendous audience, 6,000, and we all sang and sang, and at the close a young man came up and said, "Won't you come out and see me; see my little house? I have got a fine little home out here." And it was not the house he wanted me to see at all, for in that little wee cradle lay a little wee boy, and he said, "Mrs. Morgan, that kid is not going to be raised on ragtime." I didn't say a word.

It was at the same Farmers' Week, as old Uncle Ezra, as everybody in New York State learned to call him, came up to me tottering, 86 years old, and said, "Mrs. Morgan, I love the songs you have been singing and asking us to sing. I made a special effort to get to Farmers' Week this year. Mrs. Morgan, I don't believe I will ever be able to make it again. I want to say something, Mrs. Morgan, you are not singing enough of the songs of the homeland; I want you to sing more of the songs of the homeland." It took me a full minute to know what he meant by the songs of the homeland, and then I understood. The young man who was about to build an earthly home, wanted fitting songs to raise the little boy on; the old man had lived his earthly life and wanted songs describing his home in the world to come, and he said "Will you sing one if you know any?" I said "I will." We went in and closed the door and he began to sing and I sat and listened, and he sang a song which I think a great deal of, because it is the first hymn that I remember my mother and father singing, and I sang it with him, and Mr. Van Renslaer said that the prettiest sight of all Farmers' Week was the grown people going back and forth to lectures, stopping at that door and listening to the old man singing and joining in the chorus.

Last Easter Day I started to see old Uncle Ezra because I was near Syracuse, where he lived, and his daughter-in-law came to the door and said, "Mrs. Morgan, he has passed on; I didn't know your address, or I should have sent you word. He passed on but left you this message," and she handed me the message. He had said, "Mrs. Morgan, don't forget, wherever you go, to tell all the people to sing the songs of the homeland in their homes and their churches and their schools;" and everytime since I have said to the people, "Let us sing old Uncle Ezra's song, the song that you know and I know." We will sing one stanza, not in memory of him, but because we all know something of what it means. It begins "There is a land that is fairer than day," and the chorus is "In the sweet bye and bye." Sing it if you know it; some of you don't, but most of us do. (The stanza was sung).

Just one more, and that is the hymn best known of all the hymns in all the world. The hymns are love songs too, as you well know. Not long ago Mr. Morgan and I took a trip to the Holyland, to Palestine, and there they took great delight, apparently, in pointing out to us just where this incident of the Old Testament happened, and just where that happened, of the Old Testament especially. You know the fact is, they cannot possibly know just the spot, but it makes so little difference. When we came to Bethlehem, they said "This is surely the place where Jacob had his dream;" and I said to myself "Maybe it is, it doesn't make much difference to me." I looked at the little chapel marking the spot. But I remembered two things, one that Sarah Flower Adams, when her sister died, as we say, said "There is no God, there is no God, else I should not be allowed to suffer, the last of my family gone and I alone."

She withdrew from what is called the Church of England and two years later she said, "There must be a great controlling love," and in her dairy, she put a stanza:

"Nearer my God to Thee,
Nearer to Thee,
E'en though it be a cross
That raiseth me.
Still all my song shall be,
Nearer my God to Thee."

She writes about two years later, she was reading the story of "Jacob and His Dream," how angels pointed the way, which way to go, when he was in a dilemma, and laying himself down to sleep, thought he saw these angels connecting heaven and earth, and she said "I don't doubt Jacob's dream, but I do know there are angels in my life showing me which way to go," and she wrote some more stanzas paralleling Jacob's Dream:

"Though like the wanderer,
The sun gone down;
Darkness be over me,
My rest a stone.
Yet in my dreams I'd be,
Nearer my God to Thee
Nearer to Thee."

For Jacob, you know, erected a little tomb and called it Bethel-House of God:

"Then with my waking thoughts
Bright with Thy praise;
Out of my stony grief,
Bethel I'll raise;
So by my woes to be,
Nearer my God to Thee,
Nearer to Thee."

She little dreamed that she was writing a hymn; least of all did she dream that she was writing the hymn that is the best known hymn in all the world to-day. I have heard it in thirty languages, and if you call the languages of the East Indian ten languages, I have heard it in forty, and it is sung in as many more languages and dialects. It is the Universal Prayer. Everybody, sooner or later, feels in his heart, "Nearer My God to Thee." Whatever we may say about it, we all have a prayer and that is pretty nearly the language. That is why we sing it, I think. Let's sing one stanza of the world's best known hymn, "Nearer My God to Thee." (The stanza was sung).

Just another word or two, and then I have finished for to-night. That song I told you was Sarah Flower Adams', but I didn't say so in my own heart. I remembered that she wrote it. What did I think? I remembered when I was fourteen my mother whom they say is not living, but who is living so powerfully as all good mothers must always live, in her children, my mother said to me, when I was fourteen, "Daughter, take a hymn and grow up with it." I didn't know what she meant, but mother kept at it and helped me choose one, and she helped me choose "Nearer My God to Thee." At fifteen I didn't understand, but I committed it to memory. At twenty I didn't understand; only at thirty did I understand only a little, but now that I am forty or so very near it, I can understand as I certainly could not before my mother went to her great rest only three years ago, after sitting for twenty-five years in an invalid's chair, not moving, all sunshine, all sweetness, and singing "Nearer My God to Thee."

What did I think of when I saw Bethel in Palestine? I thought of what mother said, "Take a hymn and grow up with it," and that was my hymn. Oh, I want to urge upon you the bravery to say, when you hear the song that does not live, "Why sing it, it can't do you any good?" And then the strength to say "There is a song I'd be glad if you knew," and suggest that song and use your influence in the church and the school and the community, and most of all in your own home, to wipe out the foolish, meaningless passing songs, substituting the songs that live so that we, as American people shall grow up a singing people, binding together as I think little else can bind, the human heart.

Thank you for staying so long; thank you for responding, and if ever I can help you to find your particular song in your particular mind, as I have rather a good chance to do in New York and am doing every week, drop me just a postal, if you will, to Columbia University, and say, "I would like to get hold of such and such a song, will you find it for me?" It will be my deep happiness to respond and send it back to you. I am your co-worker in a sense way beyond anything I can tell you to-night. Thank you very much. (Applause).

MEMBERS

OF THE

Pennsylvania State Board of Agriculture

For the Year 1917.

MEMBERS EX-OFFICIO

HON. MARTIN G. BRUMBAUGH, Governor.
HON. HENRY HOUCK, Secretary of Internal Affairs.
DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
DR. EDWIN ERLE SPARKS, President of the State College.
HON. A. W. POWELL, Auditor General.
HON. CHARLES E. PATTON, Secretary of Agriculture.

APPOINTED BY THE GOVERNOR

	Term expires.
Robert J. Walton, Hummelstown, Dauphin County,	Term expires 1918
Cloyd B. Ewing, Mount Union, Huntingdon County,	Term expires 1919
Charles F. Jenkins, Philadelphia,	Term expires 1920

APPOINTED BY THE PENNSYLVANIA STATE POULTRY SOCIETY

W. Theo. Wittman,	Allentown,	1920

APPOINTED BY THE PENNSYLVANIA BEE-KEEPERS' ASSOCIATION

E. A. Weimer,	Lebanon,	1918

ELECTED BY COUNTY AGRICULTURAL SOCIETIES

Adams,	A. I. Weidner,	Arendtsville,	1918
Allegheny,	C. L. Hood,	Coraopolis, R. D.,	1918
Armstrong,	S. S. Blyholder,	Kelly Station,	1920
Beaver,	Walter C. Dunlap,	West Bridgewater,	1920
Bedford,	Wm. F. Biddle,	Lutzville, R. D. 1,	1918
Berks,	H. G. McGowan,	Geiger's Mills,	1919
Blair,	W. Frank Beck,	Altoona,	1920
Bradford,	Louis Piollet,	Wysox,	1919
Bucks,	B. Frank Wambold,	Sellersville,	1920
Butler,	Geo. A. Bicker,	Cabot,	1920
Cambria,	L. J. Bearer,	Hastings,	1919
Cameron,	R. P. Heilman,	Emporium,	1919
Carbon,	Edward Lienhard,	Mauch Chunk,	1920

			Term expires.
Centre,	John A. Woodward,	Howard,	1918
Chester,	M. E. Conard,	Westgrove,	1918
Clarion,	J. H. Wilson,	Clarion,	1919
Clearfield,	T. L. Way,	Curwensville,	1919
Clinton,	Joel A. Herr,	Millhall,	1917
Columbia,	A. C. Creasy,	Bloomsburg, R. D.,	1919
Crawford,	W. F. Throop,	Espyville,	1918
Cumberland,			
Dauphin,	E. S. Keiper,	Middletown,	1920
Delaware,	Thos. H. Wittkorn,	Media,	1920
Elk,	John G. Schmidt,	St. Marys,	1919
Erie,	D. Warren De Rosay,	Corry,	1919
Fayette,	John T. Smith,	Dunbar,	1919
Forest,			
Franklin,	J. P. Young,	Marion,	1920
Fulton,	Frank Ranck,	Hancock, Md.,	1919
Greene,			
Huntingdon,	George G. Hutchison,	Warrior's Mark,	1918
Indiana,	S. C. George,	West Lebanon,	1919
Jefferson,	Peter B. Cowan,	Brookville,	1919
Juniata,	Matthew Rodgers,	Mexico,	1918
Lackawanna,	Horace Seamans,	Factoryville,	1919
Lancaster,	J. Aldus Herr,	Lancaster,	1920
Lawrence,	Doris L. Fulkman,	New Wilmington,	1919
Lebanon,	Edward Shuey,	Annville, R. D. 2,	1919
Lehigh,	P. S. Fenstermacher,	Allentown,	1918
Luzerne,	J. E. Hildebrant,	Dallas,	1918
Lycoming,	B. F. Kahler,	Hughesville,	1918
McKean,	E. A. Studholme,	Smethport,	1919
Mercer,	W. C. Black,	Mercer,	1920
Mifflin,	C. M. Smith,	Lewistown,	1919
Monroe,	F. S. Brong,	Saylorsburg,	1919
Montgomery,	John H. Schultz,	Norristown,	1920
Montour,	J. Miles Derr,	Milton, R. D.,	1919
Northampton,	C. S. Messinger,	Tatamy,	1918
Northumberland,	Wm. A. Fisher,	Milton, R. D.	1919
Perry,	Clark M. Bower,	Blain,	1919
Philadelphia,	David Rust,	Philadelphia,	1919
Pike,	B. F. Killam,	Paupack,	1918
Potter,			
Schuylkill,	John Shoener,	Orwigsburg,	1919
Snyder,			
Somerset,	Robert W. Lohr,	Boswell,	1920
Sullivan,	G. Eugene Bown,	Forksville,	1918
Susquehanna,	Dr. E. E. Tower,	Hallstead,	1919
Tioga,	C. H. DeWitt,	Mansfield,	1920
Union,	J. Newton Glover,	Vicksburg,	1920
Venango,	Joseph McElhaney, Jr.,	Franklin,	1918
Warren,	R. J. Weld,	Sugargrove,	1920
Washington,	Jas. M. Paxton,	Houston,	1920
Wayne,	W. E. Perham,	Varden,	1920
Westmoreland,	W. F. Holtzer,	Greensburg,	1919
Wyoming,	G. A. Benson,	Tunkhannock,	1919
York,	Geo. F. Barnes,	Rossville,	1920

OFFICERS

PRESIDENT

Hon. Martin G. Brumbaugh,	Harrisburg.

VICE-PRESIDENTS

John Shoener,	Orwigsburg.
Louis Piollet,	Wysox.
Dr. E. E. Tower,	Hallstead.

EXECUTIVE COMMITTEE

S. S. Blyholder,	Kelly Station.
Dr. M. E. Conard,	West Chester.
Hon. H. G. McGowan,	Geiger's Mills.
W. Frank Beck,	Altoona.
J. P. Young,	Marion.
Matthew Rodgers,	Mexico.
P. S. Fenstermacher,	Allentown.
C. M. Bower,	Blain.
Hon. Charles E. Patton, Secretary, Ex-officio,	Harrisburg.

MEMBERS OF ADVISORY COMMITTEE

John P. Young,	Marion.
Clark M. Bower,	Blain.
W. Frank Beck,	Altoona.

LEGISLATIVE COMMITTEE

H. G. McGowan,	Geiger's Mills.
R. W. Lohr,	Boswell, R. D. 1.
Geo. G. Hutchison,	Warrior's Mark.
Matthew Rodgers,	Mexico.
P. S. Fenstermacher,	Allentown.

COMMITTEE ON RESOLUTIONS

John A. Woodward,	Howard.
B. Frank Wambold,	Sellersville.
B. F. Killam,	Paupack.
W. C. Black,	Mercer.
J. Aldus Herr,	Lancaster, R. D.

MEMORIAL COMMITTEE

J. Miles Derr,	Milton, R. D.
E. A. Studholme,	Smethport.
S. C. George,	West Lebanon.

CONSULTING SPECIALISTS

Botanist,	Prof. F. D. Kern,	State College.
Pomologist,	Chester J. Tyson,	Floradale.
Chemist,	Dr. William Frear,	State College.
Vet. Surgeon,	Dr. C. J. Marshall,	Harrisburg.
Sanitarian,	Dr. W. Frank Beck,	Altoona.
Microscopist and Hygienist,	Prof. J. W. Kellogg,	Harrisburg.
Entomologist,	Prof. J. G. Sanders,	Harrisburg.
Ornithologist,	Prof. Boyd P. Rothrock,	Harrisburg.
Meterologist,	Prof. W. G. Owens,	Lewisburg.
Apiarist,	H. C. Klinger,	Liverpool.
Economic Geologist,	Prof. Baird Halberstadt,	Pottsville.
Agricultural Geologist,	W. H. Stout,	Pinegrove.
Forests and Forestry,	Irvin C. Williams,	Harrisburg.
Feeding Stuffs,	G. G. Hutchison,	Warrior's Mark.
Soils and Crops,	Prof. Franklin Menges,	York.

STANDING COMMITTEES

CEREALS AND CEREAL CROPS

John P. Young, ... Marion.

CONSTRUCTION AND MAINTENANCE OF EARTH ROADS

George F. Barnes, ... Rossville.

FRUIT AND FRUIT CULTURE

A. I. Weidner, ... Arendtsville.

DAIRY AND DAIRY PRODUCTS

Dr. M. E. Conard, ... Westgrove.

FERTILIZERS

John H. Schultz, ... Norristown.

WOOL AND TEXTILE FIBERS

W. C. Black, ... Mercer.

LIVESTOCK

James M. Paxton, ... Houston.

POULTRY

W. Theo. Wittman, ... Allentown.

MARKETING

J. Aldus Herr, ... Lancaster, R. D.

PAPERS READ AND ADDRESSES DELIVERED AT THE THIRTY-SEVENTH ANNUAL MEETING OF THE PENNSYLVANIA STATE BOARD OF AGRICULTURE, HELD AT HARRISBURG, PA., JANUARY 23, AND 24, 1917

REPORT OF COMMITTEE ON CEREALS AND CEREAL CROPS FOR 1916

By J. ALDUS HERR, *Chairman.*

It has been the annual custom to give reports of the several crops grown in the State; but as statistics are rather dry facts, I will excuse the audience if they slumber while I present this report.

The five great cereal crops produced in Pennsylvania during 1916 were worth, to the farmers, $113,487,884. Wheat alone showed an increase in production over the 1915 crop; corn and rye production was slightly below last year, and there was a marked decrease in oats and buckwheat crops. Despite the shortage in bushels for the past season, the total value of the crops was much higher than the 1915 crop, which was valued at $95,932,420, this being an increase in total value over 1915 of $17,555,264.

WHEAT

Estimated area harvested, 1916, 1,333,540 acres; average yield per acre, 18 8-10 bushels; total estimated production, 25,070,500 bushels; average price per bushel, $1.46; total estimated value of crop, $36,602,930.00.

CORN

The estimated area harvested, 1,461,120 acres; average yield per acre (shelled), 37 bushels; total estimated production, 54,061,400 bushels; average price per bushel, 92 cents; total estimated value of crop, $49,736,488.00.

A little information relative to a few of the southeastern counties might be of some interest. Lancaster county leads in total production as well as in yield per acre of corn, the corn crop being 5,233,000 bushels with a average yield per acre of 65 bushels. York county is second with an average of 60 bushels and a yield of 4,715,820 bushels; Berks county showed an average of 51 bushels and a yield of 2,935,968 bushels, while Chester county showed an average of 57 bushels and a yield of 2,842,305 bushels. Franklin county has an average of 50 and a total production of 2,949,000 bushels, and Adams county an average of 51 and a production of 2,255,181 bushels; Bucks county had an average of 48 and a production of 2,302,512 bushels; Cumberland county an average of 48 and a total yield of 2,132,488 bushels. The eight mentioned counties produced over 25,000,000 bushels, or nearly half the total production of the State.

RYE

The estimated area harvested, 266,000 acres; average yield per acre, 16.9 bushels; total estimated production, 4,495,400 bushels; average price per bushel, $1.04; total estimated value of crop, $4,675,216.00.

OATS

Estimated area harvested, 1,050,680 acres; average yield per acre, 31 bushels; total estimated production, 32,571,000 bushels; average price per bushel, 55 cents; total estimated value of crop, $17,914,050.00.

BUCKWHEAT

Estimated area harvested, 279,970 acres; average yield per acre, 16 bushels; total estimated production, 4,480,000 bushels; average price per bushel, $1.04; total estimated value of crop, $4,659,200.00.

POTATOES

Estimated area harvested, 265,000 acres; average yield per acre, 70 bushels; total estimated production, 18,564,000 bushels; average price per bushel, $1.30; total estimated value of crop, $24,133,200.00.

HAY

Estimated area harvested, 3,195,900 acres; average yield per acre, 1.64 tons; total estimated production, 5,241,270 tons; average price per ton, $14.50; total estimated value of crop, $75,998,415.00.

SUMMARY OF REPORT

The corn crop has fallen 730,000 bushels below 1915 yield, there being nearly 51,000 acres less planted, owing to lateness of season and farmers not being able to get the crop planted early enough to have time sufficient to mature. Much of this fact is due to the scarcity of farm laborers and a very large portion to the farmer himself not beginning soon enough so to be ready to plant when conditions present themselves.

We find these same conditions relative to the potato yield, it being far below normal, yet there were some farmers who had fine crops practically under the same conditions proving that much of the difficulty is with the individual man.

Wheat alone showed an increase in production over 1915 crop, the average production per acre being 18.8 bushels. This is far below the possible production. If better methods were followed it would be more profitable to increase the production per acre than to grow additional acreage.

The hay crop ranks first in value, nearly $76,000,000, and much of the land devoted to grass practically receives little attention. This one fact is very detrimental to agriculture; instead of increasing fertility, the soil is depleted. Can it be possible that we farmers as a unit do not practice a better system of agriculture,

REPORT OF COMMITTEE ON ROADS AND ROAD LAWS

By COL. JOHN A. WOODWARD, *Chairman*.

The importance of highways and byways to any community or country can be neither exaggerated nor too often emphasized. "Unless the arteries and veins of communication are so maintained in their efficiency as to be capable of properly performing their functions at all times, the highest degree of prosperity will not be attained." This is a costly and laborious task, and the conditions under which it is to be accomplished are such that no small unit of territory or population is equal to it. The power and resources of at least a State must be requisitioned for it.

This is not a new thought. That great leader of public thought and action, Washington, "writing to Patrick Henry, referred to the slight progress that was being made under the direction of the local jurisdiction and suggested the necessity of developing a central state body which should have as its function the promotion of a movement for better roads and for more effective administration of construction and maintenance."

More than a century was required for this great conception to take root in our conservative Commonwealth, but finally it did so and produced action resulting in the erection of a State Highway Department twelve years ago, which was reconstructed into its present rank six years later. However, if at all, defective may have been the legislation leading up to this result, the Department is not responsible for it, nor can it effect amendment. It is the legally constituted authority over the roads of the Commonwealth, and is charged with the execution of the State road laws. It is established in its place, has worn its way into working order, and is doing its best to deserve the confidence of the public.

Since agriculture is the most important productive interest in the State, depending more absolutely than any other upon efficient roads for its successful prosecution; and since this Board of Agriculture is its oldest, most unselfish, and unhampered representative, your Committee ventures to express the hope that the Board shall stand by the State Highway Department whenever it can consistently do so.

Within this year a notable court decision was made in the Dauphin county court by Judge Kunkle, defining and establishing the difference, so far as maintenance is concerned, between roads which have been declared State Highways and given route numbers by act of assembly and those which have been "taken over by the State Highway Department from the several counties," as directed by that act. The decision is that until the State Highway Department shall have formally taken over any such section, and so notified the proper county or township officers, the burden of maintenance remains upon the county or township authorities, as the case may be. It is important in that it will operate to defend the Department from embarrassment in cases where, through legislative log-rolling, sections of road of not sufficient importance to warrant it have been placed upon the list of highways; and to prevent local authorities from neglecting to keep roads in proper repair while the Department is preparing to take them over.

Another decision, perhaps still more far-reaching that the one just noted, made in the Allegheny courts by Judge Davis, holds that "the Commonwealth of Pennsylvania is not liable in law to pay to private individuals, in tort, damages sustained by reason of personal injuries and loss of personal property, even though such injuries and loss of personal property be occasioned through the negligence of the Commonwealth's agents, officers or employees." That seems to be in accord with law, precedent and common sense; and brings directly to our consideration and anomaly in apparently judicially-made law existing in our Commonwealth, which has been brought to the attention of your Committee by a distinguished attorney of the southwestern section of the State, and which he protests as "illogical and absurd." It appears that townships, which are the unit of our road districting system, may be held for damages to person and property; but that in school districts and poor districts, covering precisely the same geographical territory, this is not done. The learned attorney holds that by the working of this procedure "thousands and tens of thousands of dollars are every year diverted from road making into the hands of individuals through damages;" and suggests as an effectual remedy a simple act declaring that "counties, townships, school districts and poor districts shall not be held liable for the torts, negligence, misfeasance or malfeasance of their officers." Without attempting any argument upon what seems to the layman a common sense proposition, and disclaiming any dictatorial purpose whatever, your Committee suggests that perhaps the Board's Legislative Committee may deem this subject worthy of its consideration.

Substantial support in the efforts to attain "Good Roads" has been tendered in Pennsylvania and all the other states during the year, by Act of Congress of July 11, 1916, the expressed purpose of which is "To provide that the United States shall aid the States in the construction of rural post roads and for other purposes."

The total amount appropriated is $85,000,000. Of this $10,000,000 is to be spent at the rate of $1,000,000 a year in connection with the national forest roads. The major appropriation of $75,000,000 is to be expended within five years, beginning with $5,000,000 for the year ending June 30, 1917, and ending with $25,000,000 for the year ending June 30, 1921.

Pennsylvania's share in this for 1917 is $230,644. This sum multiplied by 2, 3, 4, and 5, for the succeeding five years, will bring to us from the United States Treasury $3,459,660, which must be met in each year by a contribution from our own State of a sum equal to the federal gift for that year. This ranks Pennsylvania as third largest in the list of apportionments—only New York and Texas receiving larger sums. With the addition of the equal amount which must be appropriated by the State to be used for the same purpose, the sum of $6.919.325, is practically available for expenditure upon the "Rural Post Roads" of this State within the coming five years.

The 54,000 miles of these roads in Pennsylvania are located almost entirely in the second-class townships and constitute approximately 67% of the total of 80,000 miles of mud roads with which they are interlaced. Upon this 67% of the "country mud roads" this vast sum will be spent in permanent improvements, under the most careful supervision of the State and National road authorities. A better outlook than ever before. Since "The State is the lowest unit with which the Federal Government may cooperate and only through a State Highway Department," we are fortunate in that the new law finds us with our highly organized department, equipped with a full complement of experienced executives and engineers, ready for the promptest possible acceptance of its provisions.

The immense cost of constructing "Good Roads" is conceded; the much greater cost of maintaining them is illustrated by a little group of authentic figures from our sister State of New Jersey, noted, among other things, for its advanced position upon roads. Governor Fielder appointed a commission to inquire into this new work and its cost. They reported last July that in nine years ten millions had been spent in constructing roads and fifteen millions in maintaining them. In our own State the cost of maintenance during 1915 was more than four times that of construction. Of course there are factors entering into both these statements which would modify them, but they may serve as illustrations of the relative cost of upkeep. That this cost is not only greatly enhanced but multiplied by careless use of the road is evident to any thoughtful observer.

When it is remembered that all public roads are built at the cost of the public, that is to say by everybody, and that they are used by that same public, that is to say by everybody, it seems paradoxical to add that the relation existing between road builders and road users is, always has been and always will be that of constant antagonism or warfare. The township supervisor drives out in the morning and intelligently superintends the work of his crew in making an excellent piece of dirt road, and is a road builder. When in the evening he starts home in his buggy he at once becomes a road destroyer. The Highway Commissioner wisely and effectively directs the expenditure of six or eight millions (may the amount be greatly enlarged) a year in building the roads of the State; and when he makes a tour of inspection over them in his car, he at once enlists on the other side of the war and becomes one of his own most energetic opponents.

The legitimate traffic on the road, that for which it is purposely built, is always destructive, and there is necessary cost for the constant repair made imperative by this destruction. The careless use of the road unnecessarily adds to this cost of maintenance more than the careless user, the observer knows. If all users can be made to understand that the road is an implement, a tool, which is as much entitled to careful treatment as are the vehicles, whether they be buggies or drays, motor trucks or limousines, which they drive over it, the cost of maintenance would be cut in two more than once. They would not then drive in the tracks of those who have preceded them, wearing shallow, then deeper, and yet deeper depressions, which shortly develop into "ruts," the bottoms of which are made soft by accumulated water, and thereby more subject to further ruination;

or down which the water pours and cuts and washes until the road is hardly worth the name; and every one who is compelled to use it exhausts his repertory of unprintable epithets upon the absent supervisor or Highway Commissioner. If the whole width of the road were used with intelligent and purposeful care, instead of limiting the travel to the two narrow tracks made by the wheels, all this would be avoided. Why confine the wear and tear to two narrow lines of the width of a truck wheel when twelve feet of better roadway is available? A recent writer upon this phase of the great road subject said: "By a careful distribution of the traffic over a good road surface, the road may be made to last several times as long as it will last when all traffic concentrates in a single track."

Thus much space has been given to this matter of road care, because it has received so little attention, and because your Committee is greatly impressed by its importance and believes it should be made a subject of legislation. A law requiring vehicles of all kinds to keep as far as possible to the right of the road at all times, thus compelling the use of the whole roadway instead of but a small portion, would add many times to the life of the road, and subtract correspondingly from the cost of maintenance. Your Committee distinctly advocates an enactment of this character, or one which would empower the Highway Commissioner to make such a regulation, and suggests the qualification of the section men of the Department as officers for its enforcement.

ADDRESS

By GOVERNOR BRUMBAUGH.

Mr. Chairman and my Friends: I am glad for the meeting of this very important Board of men here in Harrisburg at this time, because we have, if we wisely organize the farm thought of this State, the opportunity of accomplishing a very important service to the whole life of Pennsylvania by devoting our time and thought and our earnest efforts in making the farm life of our people more attractive, and more remunerative in every way. In the message which I sent to the General Assembly at its opening, on the second day of January, I took occasion, as you will probably recall, to point out what seemed to me to be the salient needs along the line of the improvement of our agricultural conditions. And, then, in addition to that, in suggesting to the Legislature a general plan of development of the resources of Pennsylvania, a plan that would cover legislative action and foresight for a generation or more, I pointed out, among other things (you will find it on page 7 of the message) this statement:

> "By making liberal provisions for our farmers and farm life to the end that it will be increasingly attractive and remunerative to till our soil, to grow our food, to make life in rural places as wholesomely attractive and educative as a wise people should."

The thought underlying that is, that if we are to do for Pennsylvania what we ought to do and what we really can do, we should now begin such a conservation of our soil and such a support of our farm life as to bring Pennsylvania, in the next generation, to the point where her products will be more than doubled and the income to her farm people more than doubled. Now that is not a dream at all. Those of you who are in any way conversant with Pennsylvania conditions know that that is an easily attainable goal, and one that ought to attract the most serious and careful thought of all the people of Pennsylvania. Of the adult population of this State which, in the aggregate amounts to something like 3,000,000 of people, about 360,000 devote themselves to agriculture and to animal husbandry and the care of our forests. In other words, about 11.6% of the whole population of this State is directly in contact with the farm problem of Pennsylvania; they are the food makers, the food producers. They are the people who bring to the markets of the Commonwealth the sustenance for the army of industrial workers in our great mills and forges and factories and other industrial establishments.

Now, if one could sense that problem in a big and right way, it would soon become manifest, as you think about it, that what we need, first of all, in Pennsylvania, is an increased percentage of our people on the soil and an increased understanding on the part of those who live upon the soil, of their possibilities and of their opportunities. In other words, the steady drift of the population of the State to the cities and to the industrial establishments is gradually lessening the number of people proportionately in this Commonwealth that give themselves to the agricultural problem, and we are increasingly face to face with the fact that we must go outside our borders for the food to nourish our own people, a situation which is by no means comforting and an outlook which is by no means satisfactory to the people of Pennsylvania.

About 54% of the soil of this State lying in the interior mountain districts lends itself only sporadically to agricultural interests in the narrow sense of being soil that produces large crops of cereals and other soil grown food products, and yet that great inland tier of counties with its marvelous scenery and its groups of life in villages and towns and cities, constitutes really the hope of Pennsylvania because that is our undeveloped opportunity in this State. It is, I take it, from there, in that DeKalb soil belt, that we shall, in the future, bring to pass the largest possible good, agriculturally, to the people of Pennsylvania. These splendid and highly developed counties in the eastern part of the State lying on the Piedmont Plateau are today producing very large quantities of food; they are well cultivated; nearly all the soil is under a high state of treatment and there is there an agricultural condition which, in a general way, viewed from the point of our present national standards, is entirely satisfactory; in other words, it is doing its part in bringing about satisfactory conditions of food supply to our people. But this other section which begins here with the Blue Mountains and stretches practically to the Ohio border, that section is, today, far below its possibilities, and is not bringing to the markets of the Commonwealth anything like the products which it could bring if scientific thought, wise management and increased numbers of people turned themselves seriously to the matter of making that one of the productive centers of the Commonwealth.

Now, we are rather fortunate in that we have our State College in the very heart of that community, in one of its most beautiful valleys, and it is, through its experimentation and its work, pushing out, by scientific methods, inquiries that some day will bring to us the solution of that problem, if we who are to be the beneficiaries of that scientific study, will take advantage of that and actually apply it to the soil and not let it lie dormant merely as scientific reports from scholarly men at the laboratories. Some of you probably were with us on the agriculture tour and you will remember up near Snow Shoe, where an experiment on that type of soil, in its most aggravated form of neglect, is now in operation under the State College. That I point to as a type of the thing we must do if, in the near future, we are to bring to Pennsylvania's agricultural problems anything like a satisfactory and helpful solution.

I should like to speak also of another phase of this problem that was impressed upon my mind, particularly during the past year, in reference to the great waste in our agricultural activities in Pennsylvania. We do not even market today what we grow, even at a time when we are not growing all that we should, and I am credibly informed by men who have scientifically investigated the matter, that we literally lost millions of dollars of foods in this State during the past season because nobody turned seriously to the problem of marketing that food supply to the people of Pennsylvania. In fact, during the holiday season, I myself passed through an old orchard that was tilled by my own grandfather, and that orchard was literally covered with frozen fruit that had not found its way to the market. Now we cannot be a prosperous Commonwealth, gentlemen—and lady—unless we make it a point to bring to the market everything that the soil of this Commonwealth produces as a food supply to our people, and the Department of Agriculture here in the past year has given particular study and attention to the importance of establishing a Bureau of Markets to see to it that when a thing does grow upon the soil of Pennsylvania, that that thing will find its best market under competent direction and with immediate returns to the man who grows the food.

I should like to speak particularly of the apple situation in Pennsylvania, in that connection. As we traveled over the State this autumn, we saw literally thousands and thousands and thousands of bushels of apples either hanging upon the trees long after they should have been marketed or lying rotting upon the soil under the trees, just the neglect of somebody or the inability of somebody to sense the importance of gathering all that food and putting it where people needed it and where at this time, by reason of the unusually high cost of food, all of those apples as well as every other product of our soil, would have a ready and a welcome market. A friend of mine who is the Minister of Finance of the Government of Belgium, on a mission to this country at the opening of this present dreadful war in Europe, traveling through Pennsylvania and westward as far as Chicago and back by way of Washington to New York again, said that one thing that impressed him above everything else in

America was the waste of our people. He had come from a country where husbandry had become intensified and the treatment of the soil had been reduced to a science, where every square yard of the territory of that little country was made to produce its quantum of food for its great population, its congested population, and here he saw evidences on every hand of great waste in our food products and he could not understand how a country could be prosperous when it was so wasteful.

It happened just a few years ago that, with him and some of his colleagues at the International Exposition at Ghent, I had the pleasure of sitting for a whole day in a national council of agriculturists called in Belgium for a specific purpose. What do you suppose the purpose was? It was to discuss with the farmers of Belgium how to improve the crop of artichokes in that country. Can you imagine a conference called here in Pennsylvania to discuss the improvement of the best crop in Pennsylvania? And yet the best industry in Pennsylvania is vastly more important to our people than the artichoke industry is to that country. In other words, they had so refined their agricultural problems that the little items had become the great problems for discussion, and because, after 50 years of competition in the French markets, it had been developed that the Belgium artichoke was second and not first in its rating in the markets, this council was held to lift the Belgium crop to the top of the market. Now, I instance that because it is a type of the thing that we are going to do after awhile in Pennsylvania, we are not going to meet and talk about agriculture, but we are going to meet and talk about wheat and about sheep and about grapes and about red beets and about cabbage; when cabbage is $110 a ton, it is a serious matter, particularly to the Germans in Pennsylvania who like sauerkraut. (Applause). (Laughter). The purpose of this little statement of the situation is to show you that we have reached the point where we cannot compete with the world markets in the major crops, but because of our nearness to good markets, we should so differentiate our treatment of the soil as to bring about a much larger return to the farmer and a much larger food supply to our people. It is easily within our reach to do it. Now I see my friend George Hutchison sitting here and I am going to speak of a thing that has been in my heart for 25 years. As I travel from Huntingdon to Harrisburg, I cannot see why these neglected hillsides that fringe the banks of the beautiful Juniata River for 150 miles to its source, should not be as fine in their grapes and as rich in their vineyards as the banks of the Rhine itself. Some years ago a man who had given the subject some thought and no doubt was entirely conscientious said to me, "You cannot grow sheep in Pennsylvania; that industry has gone by." I am here to say to you that I still believe that if we were to turn ourselves seriously to the sheep industry, we would there add a quality of return to our farmers, particularly from the soil in the interior of the State to which I have referred, of which we little dream; and if the menace of the dogs that seems to be the source of our concern in that industry is imminent, surely this Commonwealth, through its legislature, can enact a law that will keep the dogs from the throats of our sheep and that will encourage and not discourage the building of a great industry and the cultivation and the care and culture of sheep in this Commonwealth of Pennsylvania. I have a motto down in my house bearing on that sheep problem indirectly which reads like this: "When it has finally been determined that the thing is impossible, watch some fellow do it." I am looking hopefully to the man in Pennsylvania who will solve that problem and fill our hillsides with great herds of sheep which will be a source of food and of wealth to our people and a very great return in money to our farm life, and I think it is easily within our resources to do that thing today in Pennsylvania.

Now, there is a corollary to this subject that I have been discussing, to which I wish for a minute to refer. If we are to grow large quantities of food on our farms and bring a large return to our people who do that service to the Commonwealth, then we must establish now—and when I say now I mean now—good, hard surface, substantial roads from our farms to our markets in Pennsylvania. (Applause). And in the long, broad analysis of the outlook of your agricultural meeting in Pennsylvania, I can see no immediately beneficial thing more far-reaching, more practical in its bearing upon the good of our whole people, than a fine system of highways everywhere wherein this Commonwealth, and I want to ask you men who are here interested primarily in the farm problem, to see to it that one element of your farm problem is a highway from your farm to a convenient and profitable market in Pennsylvania. That we can surely do and that is an investment to which the Commonwealth can turn and upon which it can enter with the absolute assurance that it will more than recover to itself all that it invests in that direction, provided only and always that the money is wisely and honestly expended in that matter. So I stand here to urge you to base your treatment of your farm problems in part at least, upon the development of an adequate highway system; not necessarily great arteries of roads at high cost, threading eastward, westward, northward and southward in your State, but highways that will bring the farms to the nearest market stations in the Commonwealth. That is the important thing today, for, after all, gentlemen, if we are to increase the population devoted to the cultivation of the soil, we have got to increase the facilities for marketing the things which they grow on the soil, and that spells good roads in the farming communities.

Finally, I want to speak of another phase of your problem. I was born on a farm and possibly most of you were. We know something of the meaning of farm life in rural Pennsylvania as it was and as it is today. If we are to keep our own people there, our boys and our girls, and make them our heirs in the development of our agricultural interests, we must make farm life not only more remunerative in dollars and cents, but we must make farm life more attractive socially and intellectually to our people. There ought to be in the great schoolhouses that are beginning to arise in Pennsylvania, consolidated schools, evening entertainments of all sorts to develop the social as well as the intellectual life of our farm people, so that the young people living out in the country will have the feeling that they are getting there what they would get under vastly less fortuitous conditions were they to go into the city. Now, it is a serious matter when a boy goes to a city or when a girl goes to a city; you hear now and then of the accidental one that has became a great man, a captain of finance, a leader of industry or a man of affairs, but we do not hear of the hundreds and hundreds of these people who ought to have remained on the farm but who, when they go into the city, find a civilization and a social organization so complex and at points so menaceful to them that, after years of effort, they are submerged into its body and they are not again considered or thought of. We lose them, lose them as productive units often, in the city, lose them utterly, where their genius and enterprise would have brought the largest good to the whole Commonwealth out upon the farms where they were born and where their fathers and mothers reared them and trained them and made them God fearing and God loving citizens. So I should like to see, if I can, a movement definitely pointing to the increasing of the social and intellectual opportunities of our people all over Pennsylvania, so that when we are born in the country, we will be glad to stay there. This is a vastly better program, my friends, than any talk of a return to the farm after once your people have gone to the city, for you know that, as a rule, those "Return to the farm" programs are interesting but never very effective. (Applause).

I want to congratulate you that you are here today, to encourage you to take up every phase of this problem that offers to you any hope or outlook for our people, and to be assured that, as far as we can. here in our public duties and as private citizens, we shall be most happy to promote in every way we can the things which you vision and find to be of good to the farm life of this great Commonwealth of Pennsylvania. (Applause).

REPORT OF COMMITTEE ON FRUIT AND FRUIT CULTURE

By A. I. WEIDNER, *Chairman*.

The planting of apples in Pennsylvania seems to have reached its maximum at the present time. There is a feeling among many of the growers that there are enough orchards planted for the present and that there is danger of overproduction. My impression is that it is well to stop planting for awhile, and that growers turn their attention to better care, cultivation, and fertilization of orchards that have been planted.

The San José scale is being held in check the past few years by parasite enemies and by continued spraying with lime-sulfur and the missible oils. There are many other insects and fungus troubles that will keep the orchardist busy to protect the trees and crop to grow first quality fruit without increasing the planting.

The development of the dust spray, of dust spray machinery is promising to be helpful in the care and protection of the orchard and fruit crop. With two men and one team it is possible to cover forty acres in one day and do a thorough job covering all the foliage better than is usually done with liquid spray; and from results obtained the past season is very encouraging. Orchards that require three men and a team two days to spray, can be given the same protection against most insects and fungus diseases in three hours time with the dust method.

Spraying for the codling moth to have best results must be done in from five to seven days after the petals fall. If unfavorable weather should come during that time the large orchardist is not able to finish his work until it is too late, unless he is prepared and has sufficient machinery and help to complete the work in that time, after the petals drop the calyx is open and is turned upward. If the weather conditions are favorable the little apples begin to grow and the calyx commences to close. After that takes place it is not possible to do good work. The poison must be placed inside the calyx and when it is closed it is ready for the codling moth to take its first meal which results fatally. Eighty per cent. of the worms enter the calyx end of the apple.

With proper cultivation, and cover crop, and applying manure or commercial fertilizers as the orchard may need, and the thinning of the fruit, which is essential to the growing of fine, uniform and well colored apples, which will always bring a good price, the orchardist is a busy man. The culls and the faulty apples should be marketed at the canning house or the evaporator, which always pays a fair price for that kind of fruit, for which they find a ready sale when put on the market in the form of canned or evaporated fruit. If this second grade of fruit is marketed in that way and not put in competition with first-class fruit, good prices will be obtained. We in Pennsylvania need not fear overproduction for some time to come when we realize that we have the best markets of the world at our very door.

The past season has been a good one for the apple growers of Pennsylvania. The crop is estimated at about thirty per cent over the crop of 1915 or approximately 585,000 barrels grown in this State. The price paid the grower was also better than was received in 1915. It is possible that there may some years come, if there is a large crop all over the United States, that there may be a glut in the market and prices be low, but I have observed in the last eighteen years that good fruit will always find a buyer and that it will bring a fair price. It usually occurs that there is a failure somewhere, and that makes it an advantage to sections having a crop to supply the demand.

The peach has not been planted so largely in Pennsylvania of late as the apple, perhaps owing to the trees being shorter lived and more easily injured by cold during winter and spring frosts. It is also necessary to care well for the peach orchard to get best results. The cultivation in the first part of the season must not be neglected in order to get good thrifty trees and fruit buds. It is now believed necessary to continue to cultivate a peach orchard late as the last of July or first of August in order to keep the trees growing to make strong vigorous buds that will resist the cold of the following winter, and produce fruit the next season.

The constant watch for the borers both spring and fall must not be overlooked as they are the worst enemies of the peach trees. Pruning needs strict attention and the trees kept with low and spreading heads so as to be convenient to gather the crop and to thin, which must be done to grow fine and luscious fruit. A tree that overbears cannot produce fine and high grade fruit. If properly thinned a peach tree will bear as many baskets of large and fine specimens as an overloaded tree will bear of small unattractive and ill flavored fruit. It is necessary to spray the peach as often as weather conditions make it necessary to control the fungus, curculio, and rot. The summer of nineteen sixteen was a remarkably good year for the man that produced fine large fruit. I know of some that were sold f. o. b. in Adams county at two dollars per bushel by the carload, while small inferior peaches did not pay to ship.

The cherry is a profitable fruit to grow where soil and other conditions are right. It requires open, porous, well drained land with an elevation for proper air drainage, for best results. The season of nineteen hundred sixteen began favorably. The crop was large and the fruit was fine. Growers began picking and shipping and were getting good returns and were pleased with the outlook of the crop. But when about half were harvested rain began and continued quite awhile, so that picking stopped and the remainder of the crop spoiled. The cherries cracked open and began to rot and were unfit for market. So growers after all in some parts of the State only had about half a crop to market.

Taking it all through I think it has been a favorable year for the fruit grower and is encouraging. We have been able, by the help of parasite enemies, and new development in spray material and machinery, and with knowledge that we are constantly gaining, to control the different enemies. We can congratulate ourselves with the prospect that overproduction is not so close at hand as is feared by some pessimists.

REPORT OF THE BOTANIST

By FRANK D. KERN.

Botany is a broad subject dealing as it does with all of the phases of plant life. Even though we separate many of the economic phases, which are closely related to certain industries, there remain many problems for the botanist, as one interested in plants from a scientific point of view, to solve.

One of the chief ways in which the botanist can be of service to the people of the State is through the identification of plants. Closely allied to this is the weed problem, for people are most likely to seek the identity of a plant which is a nuisance, or which in their opinion may become a nuisance. Your Botanist is consulted chiefly by correspondence and perhaps most frequently concerning weeds, although inquiries concerning plant diseases, mushroom growing, drug cultivation and allied topics are numerous.

It may be of interest to the members of this Board to know that, approximately, 200 species of plants have been inquired about during the last four years. This is no indication as to the number of letters since the same plant may be the subject of correspondence many times during a season. Many samples of seeds are still received but they are referred to the Secretary of Agriculture who administers the seed law. From an educational point of view, however, no opportunity is lost to urge the importance of pure viable farm seeds.

During the year 1916 the most interesting situation regarding weeds was the complaint of a bristly plant, resembling the Orange Hawkweed or Devil's Paintbrush, but having yellow instead of orange colored flowers. Examination showed that this plant is another Hawkweed (*Hieracium pratense*) perhaps best called Field Hawkweed, but known in some places as King Devil. Previous to this year this weed has been known chiefly from Eastern Canada to New York. We had one report of it in 1913. During the present season it has been located in five places and is said to be spreading rapidly. The region most affected is embraced in Clearfield, Jefferson, Clarion, and Armstrong counties. It is as undesirable as its relative, and the neighborhoods where it exists should be roused against it. The means of control would be the same as for the Devil's Paintbrush. In fields given up to hoed crops persistent and careful cultivation are effective. In pastures or grass lands an application of dry salt spread thickly enough to cover all the plants (18 lbs. to the square rod may be used without injury to the grass) has proven an effective method. This Hawkweed, like its relative, has come to us from Europe. Another plant rather recently adventive from Europe or Asia which is established in our midst is the Siberian Cranesbill (*Geranium Sibiricum*). It is not known whether this may develop the characteristics of a pest but it is widely scattered on roadsides and in waste places about State College. It is always well to watch carefully the spread of an introduced plant or of one escaped from gardens. We have one serious complaint against the Star of Bethlehem, (*Ornithogalum umbellatum*) a bulbous plant related to the garlics and onions, which has been introduced from Europe for garden cultivation. We beg to remind members of this Board that our resources are always at their disposal if they have doubts about the plants of their region.

The more or less incidental interest of the public in the cultivation of drug plants has been somewhat increased by the conditions caused by the European War. We are in need of investigational work along this line. There are doubtless many areas in the State where profitable work along this line could be done. Anyone interested should acquaint himself with all available information and should begin a small way. Many disappointments arise from the assumption that the plants used in drugs can be grown on a scale comparable with the ordinary field crops. A few of them can be so grown by people who have had experience, but for the most part cultivation of drug plants must be practiced on a comparatively small scale, at least until a good start is made. The people can themselves assist in making some headway in this industry by careful preliminary trials and cooperation.

As to plant diseases, the year has not been marked by any unusual development within the State. Fire blight of orchard trees and late blight of potatoes which were epidemic the previous season were present only in usual abundance. One of the most interesting developments within the year was the renewed interest in the white pine blister rust, not only in the State but in the nation generally, and especially in New England. This disease is of interest to those farmers who may have white pine woodlots and to all farmers who raise currants and gooseberries because in one stage the disease affects these plants. There are three diseases of this sort of tremendous interest to farmers. The black rust of wheat affects the barberry bush, the rust of apples affects also the red cedar, and the white pine blister rust affects currants and gooseberries. Wherever these plants grow in close proximity in the combinations named they are likely to be diseased. To keep them separated, that is, in the case of the apple and pine rusts, will control the diseases. Pines once affected never recover fully. The disease cannot spread from pine to pine. The disease is of such importance that the American Forestry Association spent a considerable part of a recent session considering it. The National Government will be asked for an appropriation to aid in investigating and controlling the trouble. Every state in the white pine belt should aid by appropriations for inspection and investigation. The farmer, if asked to subjugate his interest to the larger interest of the community by permitting his currants and gooseberries to be destroyed, will begin to realize what control of that type means. There will also be restrictions on the movements of nursery stock which will be felt. We cannot keep from having an interest in the situation. The disease was imported from Europe a few years ago on nursery stock and only recently has assumed alarming proportions.

One other movement has been launched within the State during the year which deserves mention, although it may not have the economic trend of those already mentioned. I refer to the organization of a Penn State Chapter of the Wild Flower Preservation Society of America. We have heard a good deal about the conservation of our natural resources, of animals and birds, but almost nothing about the preservation of plants except the trees of the forests. Civilization naturally encroaches upon our native plants and animals. But in addition to that numerous thoughtless things are being done constantly which spell destruction for many beautiful wild plants. We believe it quite as essential to consciously protect the beautiful native plants as it is to destroy the pests. The thoughtless picking of flowers by keeping them from seeding or the pulling up of runners which are for propagation, makes it difficult for the wild plants in the vicinity of populated districts to hold their own. Arbutus, Ground Pine, Moccasin Flower, Laurel, Azalea, and many others might be mentioned. The formation of a society is merely to chrystallize sentiment in this connection and furnish a means for spreading the gospel of protection for these beautiful objects of nature.

RELATIONS OF LIMING TO PHOSPHATING

By DR. WILLIAM FREAR.

Thirty years ago, the subject "Lime versus Phosphates" appeared on nearly every farmers' institute program. The subject then headed a discussion of the relative merits of the two kinds of materials for the promotion of soil productiveness, and implied a similarity of effect for these different substances. Today, we recognize, amid certain similarities in effect, enormous differences in many particulars; so that, now, we are saying that neither can do the full work of the other, and that both must be judiciously used on most soils if their productiveness is to be maintained or increased. We recommend lime to sweeten sour soils, and to maintain their fitness for the growth of plants and of friendly soil bacteria; and phosphatic fertilizers to supply directly to the plant certain elements it is unable to gain from the soil in a single growing season in amount best suited to its largest development.

While old-time teaching, and good teaching, it was, has made most farmers careful about mixing lime and domestic manure before application to the soil, there is no clear vision of the fact that lime and phosphates, both useful, may act upon one another so as very distinctly to diminish or to increase their respective effects. Their use in relation to one another is, therefore, generally without regard to such mutual influences; and indeed, leaders of agricultural teaching are themselves not wholly free from the responsibility of broadly advocating certain policies either in disregard of these mutual influences, or, at least, without calling attention to them.

There is good reason, therefore, for reviving the old topic, 'Lime versus Phosphates,' at the present time, but as the heading for a new discourse, namely, one that deals with these mutual effects, particularly the effect of lime on the several phosphorus compounds used to enrich the plant's phosphoric acid supply.

Some of the most important truths upon this subject had been discovered years ago, but the investigation of scientific workers, Russian, German and American, during the past ten or fifteen years, have greatly increased our established knowledge upon the matters here in question, and have developed a foundation for practice. Since phosphoric acid is so much more costly than lime, and is used so much less abundantly, the question of chief interest is the effect of lime upon the usefulness of the various phosphates to the common crops of our rotations as grown upon the kinds of soils we have to use.

To get a clear-cut idea of the effects of liming upon the taking-up of phosphoric acid by plant roots, we need, to start with, to know something as to the manner in which this is done. Every fact we have upon the subject goes to show that the food must be dissolved in the soil moisture before the plant root, through the thin-walled region near its tip and through its little hair-like branches can absorb it. When we put a lump of sugar into a glass of water, we notice that the water penetrates at once the pores of the lump, drives out in bubbles the air the pores held, makes the lump more translucent, and presently begins to make it fall to pieces. In a minute or two, glancing through the water near the lump, we see, especially if we set the water in motion, little lines showing that the water near the sugar is more dense than the main body of the liquid. After a long time, all the sugar will have disappeared, and the entire body of liquid will have become sweet, equally sweet in every part, if we wait long enough. The water works in between the minute portions of sugar until they are perfectly distributed. The amount of sugar a given volume of water can dissolve at ordinary temperatures is entirely definite. When that much has been dissolved and uniformly distributed through the water, the latter can dissolve no more, until by some means we remove a part of the sugar previously dissolved. The solution is then said to be saturated.

Of some fertilizer materials, such as nitrate of soda, muriate of potash, sulphate of ammonia and mono-calcic phosphate, water can dissolve enough to form quite dense solutions. Likewise heavy brines are formed from common salt. Such substances are said to be very soluble. Ordinary soil materials, on the other hand, while few if any are entirely insoluble in water, dissolve in but small amounts. Very little of them is required to saturate the water, or fill it with all it will hold. Still, their solubilities differ greatly, one from the other. Water in a limestone region is hard from the carbonate of lime and magnesia it carries in solution, while water from a sand spring is very soft because it holds little dissolved mineral matter.

Water saturated with sugar can, of course, dissolve no more of it, unless part of the dissolved substance has first been removed. That does not, however, prevent its dissolving some other material if that material, or its solution products, do not act upon the sugar, the water will take up about as much of it, as it would dissolve were the sugar absent. What is here said of sugar solutions, is true of other solutions. But if the dissolved materials act upon one another, or if they form like solution products, then, according to circumstances, more or less will be dissolved than if pure water were to act upon these substances singly. Thus, water saturated with carbon dioxide gas will dissolve much more carbonate of lime than pure gas-free water will take up, because the gas acts upon the dissolved carbonate to form an acid carbonate of lime more soluble than the ordinary carbonate.

We must, in the next place, briefly consider the *rate* of solution, or time it takes for a solution to become saturated. For a set of conditions equal in other respects, saturation is sooner reached, first, if the amount of surface the substance to be dissolved exposes to the solvent action of the water is greater; that is, if the material is finely divided and its surfaces are free from coatings of less soluble materials that interfere; and second, the rate is increased if the liquid be stirred, so as to keep the solution from becoming concentrated at the place where the water is in contact with the solid to be dissolved. The more concentrated the solution of the material to be dissolved, the more slowly it takes up new portions of this substance. Diffusion, or the mixing of the different parts of the mixture goes on very slowly, thus checking the rate of the dissolving process.

If now we can, by some means, take the dissolved substance out of the solution, more can be dissolved. If the removing process is continued, a small body of water capable of holding in solution at a given instant only a very small amount of a given mineral, can, in time, dissolve and deliver for removal a very considerable amount of the mineral. Since diffusion is so slow a process, and decreases rapidly in rate as the different parts of the liquid approach each other in saturation, and also as the path is lengthened over which the dissolved substance must be moved, it follows that, if the seat of the removing process is near the point of solution, the efficiency of the solvent water as a source of supply for the removing process, is distinctly increased.

The rootlets and root hairs of the plant furnish an apparatus capable of removing many of the substances dissolved in soil moisture. The thin membranes that form the outer boundary of these plant organs, readily permit the simple dissolved substances to pass into the plant, and the carbonic acid formed by the breathing processes of the underground plant parts to pass out. Complex substances are not able to pass in either direction. Substances that can go through the membrane, salt, for example, can pass in until the solution inside is as strong as that outside. Moreover, the plant changes many of the dissolved materials that enter through its roots, into other substances. The instant that occurs, more of the material can be taken up by the roots, and more, in turn, can be dissolved from the soil.

The plant serves, therefore, as a more or less perfect means for removing the substances dissolved in the soil moisture, and thus makes possible the transfer from soil solid to plant during a growing season, of considerable amounts of materials that are held in the soil moisture in only minute quantities at a given instant.

Consider next, that the roots tend to grow into all the soil nooks and crannies. Especially is this true for some plants and under some conditions of food and moisture supply. With such distribution for a barley plant, Hollnigel found that the feeding mass of soil was sufficient to form a cylinder of solid material of only 1-80 inch thick around each rootlet and root hair. These organs often embraced the soil particles most closely. Evidently the films of moisture that forced themselves between rootlet and soil particles form with such root distribution, only very short paths for the dissolved materials to travel between soil and absorbing rootlet. With other plants, the distribution of roots each way from the stem is very scanty. Other things being equal, the former plants have a much better chance for life on a poor soil than have the latter plants.

It was once believed that a dissolved material could readily, though slowly pass through the soil moisture from one part of the soil to another where the supply of that material was lacking. We have had to give up this belief as applied to soils in ordinary moisture conditions. We find little such movement, and then, if at all, only when the soil is very wet, as it is during a heavy rain or while being irrigated. Ordinarily, the masses of water are not continuous, but interrupted. Instead of filling the soil spaces, the water is spread in films over some of the surface of the narrower crevices. The larger spaces are filled with air, through which dissolved materials cannot jump. Consequently, the feeding area of each rootlet is very limited, and a local deficiency of a plant food can not be made good by such material lying beyond the reach of the roots. This fact emphasizes the importance of thorough distribution of added fertilizers through the feeding root zone of the crop to be benefited.

Having this sketch of the plant feeding process in mind, let us consider the special case of phosphoric acid. It is one of the less abundant soil constituents, though present in some amount in practically all soils, and in all the rocks from which rocks are formed. The soil phosphates are all difficultly soluble in soil moisture, hence very delicate methods are necessary to determine the quantities present in drainage waters. Fortunately plants can grow in a solution in which a supply of two parts of phosphoric acid to the million is maintained.

There are three groups of phosphorus compounds in the soil that require consideration: (1) Organic compounds, of the availability of whose phosphoric acid to plants little is definitely known. (2) Calcium phosphate, the material of raw rock phosphates and of ground bone. (3) Iron and aluminum phosphates, which are similar in most important respects. In soils rich in calcium carbonate, much of the phosphoric acid is usually present as the tri-calcic phosphate just alluded to. But in acid soils, the phosphoric acid is usually present in basic phosphates of iron and aluminum. Such soils nearly always respond favorably to proper phosphate dressings.

Freshly formed iron and aluminum phosphates are fairly good sources of phosphoric acid to a great many plants. When either pure water or water rich in carbonic acid acts upon them, it dissolves away some of their phosphoric acid, but leaves behind most of the iron and aluminum from which the phosphoric acid has split off, for these residues are little soluble. As the impoverished iron and aluminum phosphates are repeatedly acted upon by fresh quantities of water, they give off their phosphoric acid less and less freely. Consequently, the iron and aluminum phosphates in an old soil, free from calcium carbonate, are commonly very basic and able to give up their phosphoric acid only at a very slow rate indeed. Still, a few crops as the vigorous rooted oat plant, sometimes are able to get from their source enough phosphoric acid to thrive, when wheat would starve.

The behavior of calcium and magnesium phosphates when attacked by soil moisture is quite different. While phosphoric acid is probably split off from the lime and magnesia, both of these bases are soluble in water. Consequently the rate at which a new portion of water can dissolve phosphoric acid from the insoluble residue is probably little, if at all diminished. Water rich in carbonic acid has a much greater solvent action than pure water. So long as the lime and magnesia are removed from the soil moisture as rapidly as the phosphoric acid is taken up, the rate of attack upon the lime and magnesium phosphates is not diminished; but, if for any reason, the soil solution becomes saturated in these basic materials, then the phosphoric acid dissolves more slowly, and many cases altogether to split off from the phosphates of these bases.

We are now ready to consider the bearing of these facts upon farm practice. Consider what happens to phosphatic fertilizers immediately upon their introduction into the soil. Ground bone, ground rock phosphate, precipitated bone and Thomas slag are brought to the land in various degrees of fineness, but all, except precipitated bone, are much coarser than the particles of most solid products thrown out of solution by chemical action. All of these phosphates have but slight solubility. Any transfer of their phosphoric acid to other parts of the soil as the result of chemical reactions carried on through the soil moisture, must go on but slowly. This results, of course, in a relatively long preservation in the soil of the original chemical character of the materials. It means also that any defect by reason of coarseness of particle, and any failure to be mechanically well distributed through the root-feeding area, must very gravely lower the usefulness of these phosphates to growing crops.

On the other hand, acidulated phosphates carry their phosphoric acid in three conditions: One, the 'insoluble,' like the lime, iron or aluminum phosphates in the original rocks or bone; another, in the more readily attacked reverted phosphates of lime, iron and alumina; a third, fairly soluble in water. The first two groups of phosphates are usually very fine, but their distribution must be effected, like that of the raw phosphates, by mechanical means. The third group is capable of distribution by solution in the soil moisture. It is true, that when thus dissolved, the water-soluble phosphates are quickly acted upon by soil materials, magnesia, iron and alumina, and thrown out of solution. But the compounds formed are very fine and they are distributed wherever the reacting materials lie. It is to these two facts that the commonly superior effects of the said phosphates are usually attributed.

It is a very common belief that the acid phosphate left in the soil after the first crop, has lost its usefulness as a fertilizer. This is certainly not always, and probably nor ordinarily true. The phosphoric acid may be taken up more abundantly than needful by the crop to which such dressings are applied. Acid phosphates are usually applied frequently and in small amounts. The after effects of large dressings are not often determinable, because of these methods of use; but where conditions have made judgment possible, the residual effects have been found quite durable.

The way is now open for a consideration of the effects of liming in light of our theories of solution. Without attempting to present the details of the numerous experiments as to the effects of liming upon the usefulness of acid phosphate dressings, we may say summarily that ill effects are rarely apparent, and good results common.

The good effects may really be due to independent actions of the lime and the acid phosphate; but they are no doubt partly owing to the fact that, when the soil moisture contains much carbonate of lime, the water-soluble phosphates are converted into tri-calcic phosphate rather than into phosphates of iron and alumina, the former continuously soluble at a good rate, the latter at a gradually decreasing rate.

When we turn to the effects of liming, whether by use of lime or of its carbonate-ground limestone, marl, etc.—upon the unacidulated phosphates, raw rock and ground bone, we find a practically universal reduction of the crop effects of these phosphates. This is true even when the two dressings are applied to acid soils. The acid carbonate of lime in the soil moisture depresses the solution rate of the phosphates. The crop result is exactly in accord with our theories.

But, you may say, "Hold on!" Didn't you say earlier that soils rich in lime were noted for fertility, and therefore must yield phosphoric acid well to the crops? And haven't you just said regarding acid phosphates, that liming more frequently increased rather than diminished their crop effects, and yet that the phosphate resulting from their application to a lime rich soil is the same tricalcic phosphate that is found in raw rock and ground bone? How then should liming depress the crop value of this same material supplied merely from a different source?

These questions are precisely logical, and my answer must be that our theories have not yet caught up with the facts. That is, however, no sound reason for disregarding well established facts. Every time the matter has been well tested, when the lime has been used with ground bone or raw phosphate rock, on lands deficient in phosphoric acid, the crops suffered a lack of phosphorus, gave lower yields and contained less phosphorus when analyzed, than when the raw rock or ground bone was used alone. It is true that on our soils, dressed with bone or phosphate rock, crops are often dwarfed because of acidity, and that the dwarf plants are often unusually rich in phosphoric acid. It is also probably true, as Truog has recently suggested, that those crop species which respond best to dressings of raw rock phosphate—clover, alfalfa, the mustard family and buckwheat—take up larger amounts of lime than do most plants. They would therefore take up both the lime and the phosphoric acid, split off from the rock phosphate as it is dissolved by the soil moisture, and thus prevent such accumulations of lime in the soil water as would seriously lower the rate at which these phosphates are described.

The practical hints that follow from the facts I have presented are:

(1) Raw rock phosphates are best applied to sour soil.

(2) Lime dressings should not be made at the time of the raw phosphate dressings. If the soil is too sour to produce a fair crop, some liming is necessary at once, but only the serious excess of acidity should be first overcome, care being taken to avoid making the soil alkaline.

(3) The application of raw rock or ground bone should be made sometime, a year or two, in advance of full liming, if the best paying results from these phosphate dressings are to be secured.

(4) The raw rock dressings should be applied in close time relation to the use of the ground for crops that feed heavily upon both lime and phosphoric acid.

REPORT OF POMOLOGIST

By CHESTER J. TYSON.

You will recall, in my last report, that I urged you to select, in my stead, an expert Pomologist who could give you the best up-to- date information along the lines of scientific pomology. I meant just what I said, but you have not seen fit to relieve me. From this I am going to assume your approval of the kind of a report I have been making, and again devote this paper to a few phases of business fruit growing that seem to me to be more or less vital.

This is legislative year and many bills will be introduced in one way or another affecting the business of fruit growing. Some of these will be good bills and some of them will become laws. Unfortunately, many bills are introduced without proper consideration of results, or with some selfish motive. Let us make it a part of our business for the next few weeks to keep in touch with legislative matters through our representatives. Too much legislation can ruin any industry. Let us have less of it and let us do what we can to prevent the passage of bad bills.

During the session of 1915, an effort was made to pass an apple package and grade bill. Such a bill was introduced and its passage urged. Members of your body felt that such action was premature and unwise, and the bill was defeated, after passing the Senate and second reading in the House. Some thoughtful persons feel that Pennsylvania is not yet ready for legislation of this kind; some others feel that we already have too many laws; while still others seriously doubt the wisdom of establishing further salaried state inspectors. I am inclined to side with all three of these views, and yet each one of us has at some time or other, had knowledge of dishonest practices in the matter of packing fruit, and has wished that some way might be devised to end them. Moreover, several eastern states, eight I believe, have passed grading laws in the past few years, and still others are considering such laws, so that through the whole eastern United States is a growing sentiment in favor of better packing methods and a demand for carefully thought out and wisely planned legislation affecting packages and brands. Moreover, there is a growing feeling of dissatisfaction on the part of retail dealers and consumers, who contend that they are not getting a square deal when they buy a barrel of apples on the basis of its "face" or top layer, and then find from twenty-five to fifty per cent. of the balance of the barrel materially smaller and of poorer quality. No doubt you and I would feel the same way. At any rate, many of these people are demanding that they be given some legal guarantee that they will get what the pay for. They have the ear of the newspapers and can make a lot of noise, as shown in the recent egg and poultry boycott agitation. So urgent have these demands become that bills will be introduced in the coming session to regulate the packing of apples. Instead of condeming the whole procedure and preparing to fight it, had we not better calmly consider what features should be introduced into these bills to best serve the interests of our business, without bringing hardship on anyone, at the same time recognizing the fact that by giving the consuming public a square deal we gain their confidence. In the end they will use more fruit and our business will prosper.

New York on one side, and Maryland on the other, have passed laws defining certain standard grades for apples in closed packages, based on percentages of color and freedom from defects, and requiring the judgment of trained horticultural inspectors to determine whether or not a packer has been guilty of breaking the law, consequently subject to heavy penalties. In the writer's opinion, these laws are too complicated and too difficult to enforce to fit the greatly varying conditions and the widely scattered orchards of Pennsylvania. Laws which may work pretty well in strictly commercial apple growing districts may easily prove a serious hardship to the owners of small farm orchards. Perhaps three-fourths of the apples produced in Pennsylvania come from orchards that are not really commercial propositions.

Recognizing the demand and acknowledging the need for some regulating measures, there are a few features that can be woven into a law back of which we can all stand, and which are not likely to be opposed by honest apple growers or dealers. It seems to me that a law embodying the following features would meet these requirements:

First. Establishing a standard barrel and a standard box of the same dimensions as the United States standard barrel and box.

Second. Requiring that such closed package of apples be branded with the correct name of the variety, with the minimum size of the fruit contained, and with the name and address of the packer or the person in whose interest the packing has been done.

Third. Requiring that the "face" or exposed surface shall fairly represent the contents of the package.

In all probability such a bill will be introduced and I hope each one of you will do what he can to encourage its support.

You see I have rather definite ideas in the matter of apple branding, but here is a puzzle to me and I hope you can help to solve it.

From all parts of the State where farm lands and orchards join up closely with forests, and particularly with State reservations, we are hearing reports of serious damage to the crops and especially to apple trees, by the protected deer. I know of cases of damage to apple trees amounting to five hundred up to several thousand dollars sustained by individual growers, some of whom were promised compensation, which has not been paid, while some others have been ridiculed by State authorities for trying to grow apples near the forest lands, which is rather discouraging when we consider the efforts that our Agricultural College and our Department of Agriculture are making to reclaim waste lands for farming and orchard purposes.

The people who suffer tell us that the deer nuisance is becoming worse each year, and that, in their opinion, an open season for does as well as bucks, is the only solution in sight. I have seen the damage; it is genuine and serious and I sincerely hope something can be done to give relief.

For most part, 1916 has been a satisfactory season for fruit growers. The peach crop was rather light, but prices were high for good fruit. A fairly good apple crop ruled nearly throughout the State. Good prices were paid to growers, and in most cases dealers who bought apples have made money, which leaves a good feeling for next season.

Some new enemies appeared and some old ones were quite serious. Damage from mice seems to have been severe, while many parts of the State had serious fungus attacks. We are again impressed with the fact that in fruit growing, as in many other lines "Eternal vigilance is the price of success;" fortunately too, for otherwise everyone would plant apple orchards.

REPORT OF VETERINARIAN

By C. J. MARSHALL, *Harrisburg.*

The State has been free from unusual animal diseases during the past season and has experienced no uncommon losses from those that are prevalent from year to year. Tuberculosis and infectious abortion still continue to be of the most economic importance. To those engaged in animal husbandry both diseases must be carefully considered. Each affects cattle especially and the danger appears to increase with extensive agriculture. Much has been added to our knowledge in the past few years on the subjects of breeding, feeding, the general care of animals, the cause, means of communication and control of their diseases. Much better methods are being practiced along these lines now than were possible in the quite recent past. In the matter of safely controlling tuberculosis and infectious abortion practical results have not kept pace with the scientific progress made in other lines.

There should be some method of furnishing breeders more protection from tuberculosis and infectious abortion than is apparent at the present time. The federal or state government, our colleges, experiment stations and experts are all unable to assure one with any degree of certainty that it can be done. The average breeder may have expected too much in the past from those who should know. All perhaps have depended too much upon the tuberculin test. We have learned some things that can be done, many that cannot, and many points are still left unsolved. Up to twenty-five years ago the State gave very little attention to tuberculosis in animals or man. In 1892 we began using tuberculin to help us find tuberculosis in cattle. In 1895 the work was taken up by the State. Since that time an intelligent, energetic, expensive campaign has been conducted against bovine tuberculosis. Many valuable animals have been destroyed and the work still goes on. What is the result? Have we reduced the percentage of tuberculosis in our herds? Possibly we have. It has not been possible to eliminate the disease from many large herds that were infected and keep them free from tuberculosis for a number of years at a time. There was some reason for hoping that we might be able to identify every tuberculosis animal in a herd with tuberculin and then vaccinate those that were free and make them immune to the disease. If this were possible it would not be difficult to obtain tuberculosis free herds. A plan for immunizing animals against tuberculosis has been thoroughly tried and found impractical. The only plan we now have for getting rid of the disease in a herd and keeping it free is to destroy all sources of infection. An animal that has the disease is the most important factor. So long as there is at least one animal with the disease in a herd no one can prophecy the extent or spread of the disease in the herd. The rapidity and extent of the spread depends to a certain extent upon the sanitary conditions of the stable and the extent and location of the disease in the affected animal.

One important factor that has mitigated greatly against handling tuberculosis in a sane and reasonable manner in the past is public opinion. In the beginning all cattle that failed to pass the test were destroyed and were a total loss. Not even the hides were saved. It was soon found that the flesh from a high percentage of those condemned could be safely used for food. Public sentiment against using the meat from those that are passed as suitable for food by a federal or state inspector has practically disappeared. It is now known also that the milk from non-physical cases, but reacting cattle, can be safely handled for human food.

We still have no better method for determining the extent of tuberculosis in a herd than the tuberculin test. Nearly every animal that has been tested with it and condemned in Pennsylvania has been killed and examined by one competent to judge whether it had tuberculosis. We estimate that the disease will be found in 98 per cent of the animals condemned by a properly applied and correctly interpreted tuberculin test. It is the writer's opinion that it is not possible to detect it without the assistance of tuberculin or more than 10 per cent of those that positively have the disease. When we began to use tuberculin there was just cause to fear that animals free from the disease would be condemned. It is now pretty generally believed that this is not true and that the test is remarkably reliable on those condemned.

It has been known for a number of years that an occasional chronic advanced case would pass the test but we hoped to be able to detect them by a careful physical examination. We have found recently that an exceptional mild as well as advanced case, and those apparently in any stage of the disease, may not react to the ordinary tuberculin test. Apparently we have been unjust in the past by placing the blame for unusual results too often on the owner or the person applying the test. In many cases recently we have applied a special retest within two weeks after a careful, competent, honest tuberculin test has been made and found many more diseased animals and those that showed it in practically all stages after slaughter. The reason for such results is still a mystery. We now know that the person who depends entirely upon the ordinary tuberculin test to detect all the animals afflicted with tuberculosis in a tuberculous herd is doomed to disappointment. Whether our new plan of using tuberculin will surely locate every animal afflicted with the disease is a question yet to be determined. We do know that it will detect many that have escaped the ordinary test.

It is claimed by some that the tuberculin test is easy and reliable and that everybody should be permitted to use it. Those who have used it most extensively and studied it most carefully are convinced that it is a delicate test and that it should be used only by those who are especially trained and then only under full and complete state supervision. We have come to a point in the use of tuberculin when we should not try too see how many tuberculin tests we can make but how well we can make them.

The State should set aside a reasonable but not extravagant sum of money for the purpose of continuing the study of tuberculosis. The Department of Agriculture should take charge of a few representative herds, preferably those belonging to State Institutions. The Department should have full charge of tuberculosis and infectious abortion in those herds for several years. If it is possible and we believe it is to eliminate in a practical way either or both diseases then the State would be justified in spending a large sum of money for disseminating this information and putting it to a practical test in cleaning up our herds.

We should continue the tuberculin test and physical examination on dairy and breeding cattle brought into Pennsylvania from outside sources. We might safely dispense with the test on young animals that are brought from certain sections that are known to be practically free from tuberculosis. Whether such animals should be tuberculin tested or not could be left to the judgment of the State Veterinarian.

Each state or the federal government should make the tuberculin test and physical examination free of charge to the owner of pure bred animals on those that are to be shipped to other states that demand such examinations. The animals that fail to pass the test or examination should be placed in quarantine or destroyed. The owner should not be paid indemnity for such animals unless he is willing to have the tuberculin test and physical examination applied to every animal in his herd and handle it in full accord with state regulations. In either case he should be paid full market value for any animals condemned and destroyed by the State and found free from tuberculosis on slaughter.

All other tuberculin tests should be made under the supervision of the State at the expense of the owner. The State should not be expected to pay a generous indemnity to the average herd owner for animals destroyed on account of tuberculosis until it can be demonstrated beyond a reasonable doubt that the disease can be eliminated and the herd kept clean by practical measures.

The State has not, and should not demand tuberculin tests in any case except on interstate cattle, until it can be shown with a reasonable amount of certainty that the herd can be freed from tuberculosis and kept free. When this can be done an effort should be made to force the examination to the fullest extent and pay a reasonable indemnity for all animals destroyed. While the State does not compel herd owners to have a tuberculin test at the present time there are other influences that practically force them to do so. In some cases local Boards of Health demand the test on animals that produce milk to be sold under their jurisdiction. Many buyers demand a test before purchase and no man wants to keep a tuberculous herd if he can prevent it.

During the past year no indemnity has been paid for animals destroyed on account of tuberculosis, and very little encouragement has been given that the State would ever remunerate the owners for their losses, yet practically as many animals have been tested and slaughtered as in previous years when the State was paying a rather generous indemnity for those destroyed.

Tuberculin tests are usually worthless when applied by one who is not competent to do the work, or by one who is not in thorough sympathy with this manner of exterminating tuberculosis. It is doubtful whether much good is accomplished by tuberculin tests forced on producers by local Boards of Health. It may be useful as a means of eliminating dangerously unsanitary dairies. Where such demands are made either the State or local authorities should bear the expense of the test and see that it is made by none except those who are honest and properly qualified, and then under satisfactory conditions.

It is too much to expect to eliminate tuberculosis with tuberculin alone in herds where sanitary conditions are decidedly faulty, or where it is impossible or impracticable to dispose of those that fail to pass the test or to disinfect the stables and make them reasonably safe for continuing the business.

There is no doubt but that official supervision should be maintained over the health and sanitary conditions of dairy cattle. This authority should apparently be vested in the State.

All worn-out dairy cows that are sold for human consumption should be killed under state or federal supervision, and a more careful examination should be made of the herd to see that no cows are permitted to produce milk for human food when they have diseased udders or become emaciated and are in the last stages of tuberculosis. No animal should be permitted in the milking line that has tuberculosis to such an extent that it shows physical affects of the disease. Many cases of tuberculosis extensively diseased show no physical symptoms.

While it has not been possible to eliminate tuberculosis from herds with any reasonable degree of certainty in the past and while many discouraging, expensive, experiences have been met in using tuberculin, it has been demonstrated beyond a doubt by many sensible, reliable breeders that the disease can be profitably controlled by the judicious use of tuberculin.

It has been observed for a number of years that abortion as well as tuberculosis thrives best and is the most difficult in large herds where new animals are constantly being purchased. It is rather unusual to find such herds free from either disease. In small herds in the rural sections of the State where animals are seldom purchased very few cases of tuberculosis, abortion or sterility are reported.

It appears to be possible to control abortion in breeding herds that are kept in modern sanitary stables where most of the animals are raised on the farm. The task of controlling abortion in herds where animals are being changed constantly and where sanitary conditions around the stables and premises are not first-class is a very difficult proposition, and is practically impossible. Animals seldom abort the second time yet they are considered as affected with the disease and may spread it for a number of years after they have ceased to abort, and in many cases animals that have aborted become sterile or it is not possible to get them with calf. This condition has been brought about often by improper treatment rather than as a result of the disease itself.

No medicine or remedy will prevent or control abortion in a herd. It is possible with proper treatment to cure most cases of sterility if begun in time. It is bad practice to sell animals that abort for this reason alone. A herd from which such an animal goes is already affected and an affected animal will probably carry the infection to the new herd.

It is not impossible to outline a form of treatment for controlling infectious abortion in dairy cattle that will cover all cases. The form of treatment should be left to the good judgment of the person who is trained to give advice on this subject.

A few practical suggestions may be made for those who desire to attempt to control the disease:

Extreme care should be exercised in purchasing animals to prevent gathering those that are infected as this is the most certain way of carrying infection to non- infected herds.

In herds where the disease is known to exist the stable should be disinfected frequently; once a week at least, with some standard antiseptic that has been approved by the Federal government.

If symptoms of abortion appear in an animal, or if abortion occurs before such symptoms are observed, the animal should be removed immediately to an isolated ward and kept there until there is no discharge from the genital organs. The infectious material originates from the genital organs of cattle that are affected.

The gutters behind infected cows are especially dangerous; they should be carefully cleaned and disinfected each day. Extreme care should be given to the use of brooms, forks, shovels and shoes of men to prevent carrying infection from an infected animal that has a discharge from the genital organs to the feed, pasture or feeding floor of those that are susceptible.

Special attention should also be given to the prompt removal of the aborted foetus, the afterbirth and manure which has become infected. The foetus and afterbirth should be buried or burned and the infected litter, manure, etc., may be mixed with lime or some other suitable disinfectant and hauled to fields that are not to be used for pasturing cattle.

Nobody at present can furnish reliable information in reference to eliminating or controlling infectious abortion in a way that will be practical and positive for the average breeder. The federal government has made an appropriation of $50,000 for studying this disease. The State should keep in touch with whatever progress is made by the federal government and carry on this work as a demonstration in conjunction with an effort to control tuberculosis.

REPORT OF COMMITTEE ON FERTILIZERS

By F. S. BRONG, *Chairman*.

Logically any substance or material which makes a soil fruitful or productive is a fertilizer for that soil. But we do not ordinarily speak of many of these things as fertilizers. In this paper we will consider only the principle materials which, by common consent, we have come to regard as fertilizers.

The most ancient, the most common and the most important fertilizer for all soils is the plant which grew out of it, either in part or whole, returned to the soil. With the exception of the excrement of insects and animals and their dead bodies, this plant residue is the only one of the materials which we now recognize as fertilizers that nature used in making the earth fruitful. It is generally conceded that a certain amount of organic matter is necessary for a fertile soil, and our best authorities agree that if this material is present in sufficient amount, then no other fertilizer is necessary. In a half decayed state this plant residue is known as humus. Besides furnishing food for other plants, it improves the physical condition of the soil. The soil particles mixed with the porous, spongy vegetable matter is much more easily penetrated by plant rootlets than the soil in its original state. The dark color so characteristic of a fertile soil is the result of a high humus content. As a ball of cotton will absorb and hold more water than a marble, so a humus filled soil will hold moisture better than one without humus. In Pennsylvania we have an annual rain fall of about forty inches, and if our crops suffer from drought it is our own fault. There are several other very important conditions which decayed, or decaying plants establish in a soil. Among which are more even temperature throughout the year and a congenial home for the growth and multiplication of various classes of bacteria beneficial in plant growth. The natural home of the nodule forming bacteria for the legumes is in a humus filled soil and their artificial culture in laboratories and application to unfriendly soils can result in no lasting good.

When we remember that animal manure is simply the remains of plants or parts of plants that originally grew out of the soil, then we can readily understand why it should be an important fertilizer.

The animal body is composed very largely of the same basic substances that plants are. Animals cannot use these substances for their growth direct from the earth, so they live by eating the plants or other animals that have eaten plants. The part of the plant that is used up by the animal for growth, productiveness or energy, depends very largely on the animal ranging from perhaps five or ten per cent. in fat steers to thirty-five per cent. in growing or producing animals. The remainder is voided as waste to the animals. We have then from ninety to sixty-five per cent. of the original fertility left as manure. Owing to the fine division of the particles, the plant food in manure is more available to growing crops than the same would be in the original plants. Being a natural product manure is perfectly safe under almost any condition. In "First Principles of Soil Fertility," Vivian says: "There is little danger of lasting injury to the soil from the use of manure, while it is possible to use commercial fertilizers in such a way as to make the soil poorer after their use, than it was before."

In the application of manure to the soil, we are thoroughly convinced that it is good policy to use it as a top dressing. When nature wanted to make mineral out of plants she buried them in the earth, but when she wanted to make the soil productive, she kept her plant growth right on top of the ground.

It has been proven beyond question, that in a system of farming where the crops are fed upon the farm, and the manure judiciously saved and applied, and a wise use made of legume crops, the fertility of the soil can not only be maintained, but constantly improved. Instances are not rare where men who have followed this practice are almost forced to sell some raw produce—hay or grain—because they cannot feed it all, and the growth becomes too enormous to plow down. The idea advanced by some writers that the farmer should apply each year mineral plant food—a commercial product—equal to the amount of the plant food contained in the harvested crops, is so prodigiously foolish that it has deceived no one.

There is another fertilizer which we need to consider in this paper. A distinguished foreigner some years ago visited the United States to study at first hand our government and people. After spending some time at his self-appointed task, he returned home and in summing up his impressions said—"The Americans are a commercial people. They are money mad." The fertilizer we would finally consider is "Commercial fertilizer." When science discovered that crops lived and developed by "feeding" on certain elements contained in the soil, it was only a short step to conceiving the idea of supplying these elements in an artificial way. It was soon found that of the ten or more basic materials which plants use, only three of these got any response from the plant if applied to the soil on which it grew. These then are Nitrogen, Phosphorus and Potash.

Experiment Stations have spent more time, more energy and more money in trying to make up a good case for commercial fertilizers than they have ever spent in all the cases which ever came to them directly from the farmer's standpoint.

Commercial fertilizers, as before intimated, are designed to supply some one or more of the three plant food elements, one or more of which is presumed to be the crop limiter in a particular soil. There are certain well known products supplying nitrogen on the market, among them are Dried Blood, Dried Ground Fish and Animal Tankage, Bone Meal, Horn and Hoof Meal, Leather Meal, Garbage Tankage, Nitrate of Soda and Sulphate of Ammonia. Some of these materials also contain a certain amount of phosphorus, and the selling price is usually based on analysis. Both Linseed and Cottonseed Meal were formerly used as fertilizer, but their value as food for animals has taken these products into another class.

Up to this time, the phosphorus has been supplied almost entirely from the phosphate deposits as rock in many of our Southern states.

The rock contains from ten to twenty per cent phosphorus combined with lime and is not soluble in water. Manufacturers mix an equal weight of Sulphuric Acid with a ton of this Phosphate Rock, and have two tons of Acid Phosphate, each ton containing just one-half as much phosphorus as the ground rock or floats from which it was made.

As the mines of our country have furnished commercial fertilizer manufacturers with phosphorus, so the mines of Germany have furnished the Potash. Kainit is the crude product of the mine ground into a powder. It contains about 12½% of potash and has a high chlorin content. Muriate of Potash is produced by concentrating, and contains from 48 to 50% actual Potash. In the Sulphate of Potash, the potash is combined with Sulphuric Acid. In all these forms the potash is soluble in water. Under normal conditions, Phosphoric Acid and Potash command about the same price, which is about one-third of the price of nitrogen.

It will be observed that all these substances furnishing plant food, may be divided into two classes: Organic and mineral. As a general proposition the organic materials unchanged are safe to apply to any farming soil. Whether or not it would pay to apply them, that is another story. On the other hand, the mineral substances manufactured are generally unsafe. Our fertilizer laws are framed with the assumption that plants require a pre-digested ration. If a fertilizer furnishes plant food in water soluble form before it is incorporated with the soil, it has the approval, and gets the blue ribbon from the fertilizer control board. We wonder why it has not occurred to scientists to feed these legislators, or whoever is responsible for these laws, on pre-digested milk, eggs and beefsteak; we mean it—pre-digested—actually chewed, salivated, pepsined and boiled.

Has it ever occurred to you that with all our boasted knowledge, all our science, and all our superior wisdom, that we have made no great achievements unless the work in accomplishing those ends has been in harmony with nature? The same Creator who gave a digestive system to animals, also gave a somewhat similar system to plants, and the farming practice which seriously interferes with that system is doomed. When "Bob" Seeds saw how God made a fertile soil and declared that if God could do it he could too, "Bob" was very careful to go at it in God's way.

Commerical fertilizers cost the farmers of Pennsylvania nearly $8,000,000 yearly. Their use has a direct bearing on the future food supply of the State, and it seems to me that the whole subject is big enough to warrant serious legislative action. I would suggest that in addition to the present requirements of the law, that every bag or package of commerical fertilizers, sold or offered for sale in Pennsylvania, should have plainly printed on it the name of each and every material from which the Nitrogen, Phosphoric Acid and Potash contained in the fertilizer has been derived. There should be a sufficient penalty for violators to make it interesting. If you will tell the farmer what he is buying, you may trust his judgment, or at any rate the law will then have done its duty to him. In justice to the small dealer, mixer, or manufacturer, there should be a tonnage tax, based on analysis, perhaps, instead of the present fee system, in connection with fertilizer control work in the State.

REPORT OF COMMITTEE ON WOOL AND TEXTILE FIBERS

By W. C. BLACK, *Chairman.*

Mr. Chairman and Members of the State Board of Agriculture: In the language of the poet "I am here because I am here." I left my home 325 miles from here last evening and came in a Pullman. I came to Harrisburg from the same home 54 years ago last September. The first portion of the journey at that time by the old stage coach; the second portion on the waters of the "raging canal." When we became tired riding, we got off the boat and walked ahead to the next landing and sat in the shade until the boat came along. At Pittsburg we boarded a train on the Pennsylvania Railroad, riding in a box car with long planks for seats; those seated near enough the door could look out and see the grand old Alleghenies as we passed over and around and through them. Arriving at Harrisburg, I was located in the Capitol Park; being hungry I went down street and bought some buns. When night came, "I wrapped the drapery of my couch about me and lay down." The remainder of the quotation does not apply. The drapery was a coarse blanket and the couch was old Mother Earth where the present magnificent capitol building now stands.

I was on the program at that time, but the stage of action was further away than Harrisburg. No doubt you will wonder what this has to do with my subject for this meeting. That blanket was the whole thing—Wool and Textile Fibers—and later I learned the use of the gunny sack and the gentle art of weaving Gabions. The making of Gabions has ceased, but will be resumed on the appearance of the first hostile German U coming up the Susquehanna. Many of the textile fibers used extensively in our manufactures are not produced in Pennsylvania.

Cotton: *Gossypium Herbaceum,* is produced in immense quantities in the United States, used largely in our manufactures and exported to foreign countries. Many millions of pounds of cotton were used the past year in the making of explosives. Cotton was at one time produced in Pennsylvania but not for many years. The Sea Island Cotton is produced on islands near our southeast coast. A high grade of cotton is produced in Egypt.

Jute: *Conchorous olitorius,* is a native of tropical countries, a plant somewhat similar to hemp. Vast quantities of jute are produced in India and is used for making gunny cloth, the warp in carpets and as an adulterant in coarse goods.

Manila hemp: *Musa textilis* is produced in the Phillipine Islands and is largely used in cordage.

Sisal: *Agave Americana* or Yucca, is produced in Yucatan and Mexico and is used in cordage. Both Manila-hemp and Sisal are used in the manufacture of binder twine.

Hemp is grown in many parts of the world. Not grown in Pennsylvania but is successfully grown in Tennessee and Kentucky.

Coir, the fiber of the husk of the cocoanut, is used in the manufacture of ropes, being very light in weight but strong.

Flax: *Linum usitatissimum,* is produced in many countries, notably in Belgium and Russia. It is one of the most useful plants, not a food plant, in cultivation. Flax was formerly grown in Pennsylvania. I have seen it grown and pulled and rotted and broke and scutched and heckled and spun and woven into cloth in the neighborhood where I live.

Silk has been produced in Pennsylvania in small quantities but not in recent years. Less than one hundred years ago there was a silk craze in Pennsylvania. Promoters aided by the report of a committee of Congress exploited the propagation of the mulberry tree—*Morus Multicaulis*—for the feeding of the silk worm, claiming that as much as $600 worth of silk could be produced from one tree. Trees were sold as high as $10.00 each, but later could be bought for 3 cents each. There is standing on my farm a Morus Multicaulis tree, a relic of this craze.

None of these fibers are of importance as a product of the farms of Pennsylvania.

Wool is the only fiber of importance produced on the farms of Pennsylvania. Wool is the hair of the sheep and is different from the hair of other animals, having a crimp or wave and is covered with minute over-lapping scales which cause it to retain its shape, when spun into yarn or felted. Different qualities of wool are produced by different breeds or varieties of sheep. The quality of wool is influenced by climate, soil and location.

The different breeds of sheep are classed in three general groups known as long wooled, medium wooled and fine wooled according to the quality of wool produced. Formerly large numbers of fine wooled sheep were kept, notably in Vermont and some parts of Pennsylvania and Ohio and on Western ranches, almost exclusively for the wool and some stud flocks for the sale of breeding stock. At the present time the so-called mutton breeds are in greater demand. What wonder when wool is selling around 50 cents per pound and lambs are worth 14½ cents per pound in the stock yards.

Sheep can be kept on land unsuited for the pasturage of other live stock. Seven sheep can be kept on the pasture necessary for one cow and they will require less forage and grain feed for the winter. Fifty sheep will require no more labor for their care than is necessary for one dairy cow. Sheep feed on weeds and plants, not relished by other farm animals.

Writers on sheep husbandry usually advise pasturing sheep in a field by themselves, and that they should be frequently changed to other pastures. I am willing to go on record as saying that in my experience I have not found this necessary. If you have sufficient range with a good growth of grass, you can turn your cattle, horses, sheep and hogs into the same pasture. Be sure they have an abundance of pure water and salt, ad libitum and there is no necessity for any change of pasture. Many persons say that if you give a sheep all the salt it will eat that it will kill it. A sheep will not eat too much salt if it has access to salt at all times. Many farmers say " a fat ewe will not breed." Ewes do not get too fat to breed. Ewes get fat because they do not breed.

SOME REASONS FOR NOT KEEPING SHEEP.

Dogs—We have always had dogs and always will have them.

Fences—A large part of the tillable land of Pennsylvania is without fences, but sheep can be kept with profit on land not fit for tillage.

Parasites both internal and external—There was a time when some people had them.

I have heard that a buck deer from the State Forest Reservation came into a flock of sheep in Westmoreland county and killed several.

There are many reasons why Pennsylvania farmers should keep sheep. A look over the livestock market reports of recent date is a strong argument. Sheep should be kept to reduce the high cost of living. The farmer's family can eat the flesh, can make clothing of the wool and shoes of the skins of the sheep and with some wheat and corn, apples and potatoes and a little kraut, what need the farmers care for the "high cost of living." He produces all of these things on his farm and "what the farmer raises on his farm does not cost him anything."

REPORT OF MISCROSCOPIST AND HYGIENIST

By PROF. JAMES W. KELLOGG.

From time to time during the past few years, your Specialist has been called upon to examine samples of feeds for the presence of poisons which have been suspected of causing illness and death to livestock, especially horses, cows and hogs. During the past year, 15 such samples have been received and examined and in no case was mineral poisons found to be present, nor did there appear to be anything abnormal about the feeds; nevertheless, in every case it was claimed that illness and death had resulted from using feeds represented by the samples submitted which had formed the whole or a part of the ration. In a number of these cases a Veterinarian had reported that the feed used was the cause of the trouble. Because of the importance of and need for locating the causes of these illnesses and deaths among livestock which have occurred, it appears desirable to call the attention of the Board to this subject and to recommend how to proceed in the future in attempting to discover the causes of these complaints and, if possible, to prevent the re-occurrence of such cases of illness and death.

Because of the positive feeling on the part of those submitting samples that the feed they had been using was responsible for illness and death to livestock and because of our inability to find anything wrong with the samples, these cases have appeared mysterious and baffling. Those who have suffered losses and have appealed to us to locate the causes are entitled to assistance and no doubt have felt that we were not doing our duty when we were unable to report that the samples submitted contained poisons. In a number of these cases called to our attention the Livestock Sanitary Board has been requested to make an investigation, but because of delay in getting reports, it was impossible to make post-mortem examinations of the animals which had died and also for lack of complete details, it was impossible to solve the problems. In those cases where death has resulted, the samples received consisted mostly of middlings and corn meal, and in one case tankage. As above stated an examination of these samples failed to show the presence of common poisons and they did not appear abnormal under the microscope and yet the animals had died and the feeds were said to be the blame. This condition has caused us considerable anxiety for the reason that we want to help locate the causes of illness and death and yet we have apparently been unable to do so. We are, however, not the only ones who have been unable to answer this question satisfactorily, and at the present time the United States Bureau of Animal Industry have been carrying on experiments and making investigations of this subject. The work thus far accomplished by them indicates that there is a powerful poison produced suspected of being caused by certain bacteria which frequently occur under conditions which have been attributed to so-called forage poisoning or poisoning from harmful flora or plants which find their way into feeds. It is the duty of the Department to prohibit the sale of feeds which are harmful and we have endeavored to do this as far as possible. We must continue in this work until it can be established whether or not such losses are caused by the feeds being used or due to some other agent.

Primarily, illness and death among livestock is a subject for investigation by a veterinarian, however, there seems to be a tendency to blame the feeds in such cases, especially where it has happened that these feeds were new ones. This tendency to blame the feeds explains why we have been called upon to examine suspected samples. Authorities on the subject advise that the two principal causes of illness and death among livestock are diseased and improper or unfit rations. Disease can, of course, come from improper feeding or outside sources. The list of the diseases and illnesses which can be attributed to improper feeding, as well as by unwholesome food, is a long one and indeed many forms of intestinal trouble can be caused which may end fatally. Serious and fatal stomach and intestinal disturbances are caused by mouldy and damaged feeds, sudden change from a poor to a rich food, green feeds which are damp or wet with dew, excess of concentrated feeds and green feeds causing impaction, feeds which have fermented and contain bacteria causing production of gas, poisonous plants and plants having sharp thorns, foreign material including sand, as well as the common and well known poisons. In most of the cases brought to our attention, the ration consisted of three kinds of foods: the purchased stock food; the home grown product such as roughage and water. Other materials may be also eaten which are not furnished by the feeder and which may be found about the yard, pasture or stables, which can be dangerous. One such case as this occurred last week in which both the Livestock

Sanitary Board and Bureau of Chemistry were called upon for assistance. A firm was employed to exterminate rats in a large stable in Pittsburgh. Accordingly the necessary poison was put in a number of places including under the mangers or feeding boxes. The horses seemed more interested in what was on the floor than in the feed boxes and as a result several are dead. We received the sample of feed, as well as the material on the floor, together with specimens of the liver in which to detect the presence of poisons. During June 1915, we received a sample suspected of causing the death to four cows, in which we did find lead present. This being the only case of the positive identification of a poison.

That part of the ration which is usually sent us to be tested for poison is the stock feed. The request to test for poisons which appears so easy to be carried out is in fact difficult and requires considerable time and expense for costly chemicals. There are a great number of poisons, both of mineral and organic character. The mineral poisons are easy to detect, especially the more common ones such as arsenic, lead, mercury and phosphorus and these are the ones we test for. The organic poisons are many in number, difficult to detect and require special equipment and unless one or two are suspected, because of the symptoms noted, such as Strychnine or Cyanide, they are not tested for. Mouldy and damaged grains and feeds can be detected and these are especially dangerous as feed for horses. Only a few such feeds have been found on the markets of the State in the course of our feeding stuffs inspection work, and recently two or three prosecutions were brought and fines paid where such damaged feeds were found being sold. The amount of feed unsold was immediately taken off the market and the manufacturers co-operated with the Department to prevent future conditions of this kind. At the present time a feeding test and also bacteriological tests are being made at the Veterinarian Laboratory of the Livestock Sanitary Board in Philadelphia on some tankage which was claimed to have killed eight hogs. In this case the veterinarian called upon laid the blame to the feed claiming it contained poison. We were unable to find the common mineral poisons present in the sample and a report received on Saturday of the progress being made indicates that the tankage was not the cause of the loss. Again it looks as if we were going to be unable to locate the cause of the trouble. We were unable to receive all the data in this case, yet we made the tests and went to the trouble of carrying out feeding tests hoping to render aid, as all things pointed to the tankage as having caused the trouble.

It is interesting to note here that according to authorities on the subject, the horse, cow and ox, and also the hog, are more liable to disease and disturbances of the digestive organs than are those of other families. In the horse the intestinal surface is double the area of the skin and in the ox, nearly three times the area of the external surface, which necessitates a prolonged retention of the bulky food in the alimentary track for complete digestion. From these facts, therefore, it is not difficult to understand why food that is not normal or is in any way damaged or contains foreign materials, will cause serious and often fatal illness.

In order to prevent, as much as possible, illness among livestock and these losses to which we have called your attention, care should be taken in selecting the proper ration, a balanced ration it might be called, that this food is clean and wholesome, that the feeding places are clean and free from anything which could be harmful, that the water supply be pure, and last, but not least, that the stock receive plenty of fresh air when kept indoors for any length of time. Care should also be taken in the proper drainage of stables and pens. We are told that disease and illness of one sort or another may occur, which often is wrongly blamed on the feed, from poor ventilation and improper respect for a reasonable amount of cleanliness in the stables, pens or yards.

Now, when illness and death does occur, the Department wants to help find the cause and we ask your cooperation in proceeding as follows: First, call a veterinarian or notify the Livestock Sanitary Board at once and they will arrange to have an inspection made. The ration and water should also be changed in cases of illness. If the veterinarian claims that the ration caused the trouble, send to the Bureau of Chemistry a sample of all the rations used, including any roughage which may have been fed, and we will be glad to make an examination of the samples.

It frequently happens that some one has been suspected of placing poison in a feed or ration. We, of course, cannot protect a man from such enemies nor do we want to get drawn into factional controversies of this kind, as these are personal matters. As above stated, the Department is anxious to solve these problems and with your help and cooperation in furnishing all the information possible, first, by consulting a veterinarian and then by an analysis of samples, we hope to be able to be of service and to find the cause of these cases of illness and death among livestock.

It was regularly moved, seconded and carried that the report be accepted and placed on file with the regular minutes.

REPORT OF THE ENTOMOLOGIST FOR 1916.

By H. A. SURFACE.

Gentlemen of the State Board of Agriculture: For fifteen years it has been my duty and pleasure to submit to you an annual report, either as Ornithologist or Entomologist. I herewith submit the following as the report of your Entomologist for 1916.

The past year has seen our average annual loss in Pennsylvania of at least $60,000,000 by insects and other vermin, with an increase rather than a decrease. This increase can be expected to continue as long as factors continue that result in the destruction of our insectivorous birds and mammals, reptiles, amphibians, etc. The effects of the efforts of mankind at insect suppression are very insignificant in comparison with those of the various natural agencies that keep these pests in check, although much of its great loss is yet preventable. For example, some persons doubtless lost over fifty per cent. of their apple crops through pests, while we know others that did not lose five per cent. Ask an experienced truckman what part of his cabbage crop he lost by cabbage worms, and he will say, "Not one per cent.;" while there are some who would have us believe that over whole areas, cabbage fields were abandoned on account of depredations by cabbage worms.

While there was not as much use made of the spray pump as there should have been, this great loss was not so much due to the lack of spraying as to the failure of mankind to do his part in the great field of natural conservation. While it may not sound right to say that we have over-emphasized spraying in comparison with the attention that has been given to other features of pest suppression, yet it appears true that the *other things* have not been given the share of attention they deserve in consideration of their importance. We must emphasize the necessity of doing these "other things," in addition to spraying, to control insect pests and plant diseases. In fact, this is so very potent that if I were obliged to make a choice between (1) spraying alone (including the three applications) and (2) the other work, I should choose the latter.

Among some of the important items of pest control that do not come under the head of spraying are the following:

1. Cultivation each year or two, to control the insects in the soil, such as White Grubs *(Lachnosterna)*, Cut-worms *(Agrotis)*, Rosebugs *(Macrodactylus subspinosus)*, Ants *(Lasius, et al)*, Woolly Aphids *(Schizoneura lanigera)*, Plum Curculio *(Conotrachelus neuuphar)*, Grasshoppers *(Acrididae)*.
2. The removal of eggs of the Tussock Moth *(Notolophus leucostigma)*, Canker leaf worm *(Alsophlia pometaria)*, and Tent-caterpillars *(Clisiocampa americana)*, at the time of pruning, or whenever they can be found.
3. The destruction of fallen fruits and the pests they contain, such as apples with the Apple Maggot *(Trypeta pomonella)*, or with larvæ of Cucurlio *(Conotrachelus)*, or with the Codling Moth *(Carpocapsa pomonella)*.
4. Removal of damaged growing fruits during the process of thinning, thus getting rid of many pests as well as damaged fruits that would make seconds or culls at the expense of better specimens.
5. Removing by hand those pests the spray pump cannot reach, such as Round-headed and Flat-headed Apple borers *(Saperda candida* and *Chysobothris femorata)*, the Peach borer *(Sannina exitiosa)* and Twig Pruner *(Elapnidion)*.
6. Placing poisoned bait, such as the poisoned bran mash, around plants for such pests as cut-worms, earthworms *(Lumbrious terrestris)*, etc., or at the base of young trees for climbing cut-worms; or placing a pan of honey-scented sweetened and poisoned water under early and sweet apple trees to kill the fly parent of the Apple Maggot *(Trypeta pomonella)*.
7. Pulling out with a brush and promptly destroying the webby nests of such pests as Tent-caterpillars and Web-worms *(Hyphantrid cunea)* as soon as they display their conspicuous flags.

8. Hand-picking such pests as the Red-humped Apple Worm *(Oedemasia concinna)* before they strip the twigs of foliage, and such as the Trumpet-bearer *(a Phycitid)*, the ribbed cocoons of the Apple Bucculatrix *(Bucculatrix pomifoliella)* which often are in clusters and can be clipped off, and the flat white cases of the Shield-bearer *(Aspidisca splendorilerella)*, the Celery caterpillar *(Papillo asterias)*, Potato Beetles *(Doryphora decemlineata)* when few in numbers, the Squash Bug (*Anasa tristis)* when it first appears, cabbage worms on a few plants, etc.

9. Promptly pruning away and burning such pests as the Black Knot of plum and sour cherry, fire blight on apple, pear, and quince.

10. Washing at the right time with lime-sulfur solution to prevent damage by borers, mice and rabbits.

11. Turning pigs into fields infested with White Grubs, and into peach orchards to eat the gum and incidentally the young borers that remain under the gum for over a month before entering beneath the bark; also give the poultry opportunity to find certain insects, especially the Curculio that makes wormy stone fruits. Start turkeys in that young alfalfa field infected with grasshoppers, and see how soon it will be cleaned.

12. Destroy (by burning) all dead trees at once, and thus get rid of the bark beetles (*Scolytus)* and other pests that would develop in them.

13. Destroy wild cherry trees (*Prunus serotina)* and all worthless seedling trees around the premises. This is very important, and a law for this purpose would do much toward holding in check certain kinds of insects which use such trees as reserve multiplying places when kept in control in orchards.

14. Destroying unused portions of plants as soon as the crop is gathered helps to make the spray pump less needed; as in destroying cabbage stalks for aphids and worms, burning wheat stubble for Hessian Fly *(Cecidomyia destructor)*, and destroying pumpkin, cucumber, cantaloupe and squash vines early in fall in order to kill the Vine Aphis, the Squash Bug and the Squash Borer *(Melittia ceto)*.

15. A clean cultivation or ploughing of the apple orchard in midsummer to avert the necessity of the spray pump for a species of Apple Aphis may seem unreasonable, but the connection is in the fact that this particular plant louse passes the summer on the roots of grasses and grass-like plants, and returns to the apple trees to lay it eggs on the apple twigs in the fall. We believe that the first person to work out and prove this interesting point in insect life-histories was the writer of this report, when he was a post-graduate student and investigator with that leader of Economic Entomologists, Prof. S. A. Forbes, of the University of Illinois, in 1893-4.

16. Fumigation of grain with carbon bisulfid for the grain weevil and the Anguomois Grain Moth (*Gelechia cereallella)*, fumigating mills with hydrocyanic acid gas for the Mediterranean Flour Moth *(Ephestia kuhniella)*, fumigating houses with the same gas for household pests, applying mercurial ointment or tincture of larkspur for parasites of body or head, rubbing pigs or other animals with a mixture of lard and kerosene to kill their parasites, dusting fowls with sulfur or Plaster of Paris to which has been added gasoline and crude carbolic acid, to kill their lice, washing roosts with any oil, crude

carbolic (dilute) or lime-sulphur solution, feeding house flies poisoned bait or a dilute aqueous solution of formalin, mowing weeds often to destroy stalk-borers, fall plowing to kill cut-worms, harrowing often to kill ants and root lice, etc., all are insecticidal measures that are decidedly effective *without* the use of the spray pump.

17. Planting resistant varieties to avoid insect attacks is a good "stunt" but little heeded as yet, but we know of its efficiency, and especially recommend, for example, planting only apple trees of any kind that are worked on stalk and root to render them proof against Wooly Aphis.

18. Protect our insectivorous lowly creatures, such as toads, frogs, salamanders, lizards, turtles and serpents. Of this long list of groups of animals there are but two species (copperhead and rattler) that are in any way venomous or harmful to man, and all are highly insectivorous.

19. Protect in every way our valuable insectivorous mammals, such as bats, moles, shrews, skunks, and chipmunks.

20. Protect and conserve by practical means (already described in detail in our bulletins from the Bureau of Zoology of the Department of Agriculture) our many very valuable insectivorous birds, such as the quail, meadow lark, cuckoos, kingbird, fly-catchers, wood peckers, flickers, nuthatches, chickadees, creepers, kinglets, warblers, night hawks, whippoorwills, song sparrows, and others.

21. Destroy but few of the many members of our entire vertebrate fauna, for with the balance of Nature overthrown, who knows where the end must be?

However, we have introduced two bird pests that are not of value as being often insectivorous, and are doing more harm than good. These are the English Sparrow and the English Starling. Nine years ago we reported to this Board the importance of checking the Starling. Soon it will be too late.

The past year was another one during which the Tent-caterpillar was unusually abundant. In fact, there was some talk of observing a "Caterpillar day," but this was chiefly by persons who saw these pests in forests and on neglected trees as they rode along the highways in autos, and did not consider their absence from well-kept premises, how easily they are controlled, nor the many other insects that are more injurious but receiving less attention because less conspicuous.

Canker Worms, especially the Fall Species *(Alsophila pometaria)*, with its peculiar habit in Pennsylvania of ascending the trees in the *Spring* (instead of fall) to lay its eggs, were abundant in a few places, and the outlook promises quite an outbreak of them this year. They are met by banding the trees early (by March 1st), clipping off and burning the egg bands on twigs, and spraying with an arsenate as soon as the larvæ begin to feed.

The 17-year Locust *(Cicada septendecim)* did not develop much in this State last year; but in this year we must expect the appearance of a small and unimportant brood known as Brood XX, of this species, appearing in some of the western and northwestern counties as announced in our Bulletin on this pest in 1907. In localities where they were abundant seventeen years ago, as recorded by the older residents, avoid planting trees this spring and do not prune young trees liable to much damage until after their eggs are laid. Look out and prepare for the big brood in eastern and southern Pennsylvania in 1919.

The San José Scale (*Aspidiotus perniciousus)* was well checked by its parasites, and not many have complained about it, excepting in the western part of the State, where the parasites did not extend, but it will not stay "down." Under certain conditions, which we foresee possible, we must predict the return of the San José scale within a few years, especially if vigilance be relaxed.

Ants and Corn Root-lice *(Aphis maidi-radicis)* were very destructive in some corn fields, but they can be prevented by rotation of crops, fall plowing and good harrowing to kill all vegetation in fall and spring, planting late instead of early, and using nitrogen fertilizer to push growth of corn plants if infested.

White grubs were bad last year, and June bugs (*Lachnosterna fusca* and other species) will appear in numbers this year. It pays to poison the adults by sweetened arsenical spray on the foliage where they feed at night, and let pigs pasture and root where they are in soil this spring.

The Corn Ear-worm or Cotton Boll-worm *Heliothis armigera* was very bad last summer and fall, and must be expected again this year eating green corn, especially sweet corn, beneath the husk. It can be kept out by dusting or spraying with an arsenate as soon as the silk appears, and repeating this in a few days.

The Melon Worm *(Margaronia nitidalis)* was very destructive to melons, squash, pumpkins, and cucumbers, especially in the southern part of the State, and will reappear this year. Prevent them by arsenical spray on fruits of these vines before attacked, and destroy those infested.

The Grain Weevil and Angoumois Grain Moth continued destructive in stored grain where not properly treated, but many persons followed our advice in fumigating with carbon bisulfid and had good results. Early threshing of grain, not letting it remain long in the straw, is the best preventive of loss.

Apple Aphids and other Aphids were unusually destructive. Tobacco decoction spraying, when strong enough, kills them. The best remedy for the Apple Aphis is to apply strong lime-sulphur spray, as for Scale, just after the leaf buds burst, but before the leaves expand.

Wooly Aphids on the roots of trees are serious in results, but are controlled by removing the earth from above infested roots to expose them, and covering with tobacco dust, and then replacing the earth. Tobacco dust is now prepared and sold commercially for insecticidal purposes.

The root maggots (larvæ of flies of the genus *Phorbia)* have been very destructive to cabbage, radishes, turnips and other Cruciferous plants, as well as to onions, etc. The best preventive is early and repeated spraying with sweetened arsenical solution, such as arsenate of lead.

The Apple Maggot or Railroad Worm extended its range clear across Pennsylvania, from north to south, in accordance with our previous predictions, as it was found destructive in Bedford and some other southern counties, having long been known as very destructive northward. Prevent damage from this pest to early and sweet apples by poisoning, as already suggested in this report.

Dust "spraying" or dusting is again coming around. About twelve years ago the writer and Mr. Gabriel Hiester (then President of the State Horticultural Association) and others had some real experience with it and published concerning it in our reports to this Board. Reports of the State Horticultural Association, our bulletins, etc. The substance of these reports is to the effect that dusting is not, for most pests, as effective or economic as liquid spraying. Let anyone who may wish try it carefully for himself. It is not a new fad, but has been tried before.

During the past year there was ample proof, in this State, Virginia, and others, of the fact that a slight amount of arsenate of lead added to lime-sulfur solution to apply as a wash for the prevention of damage by borers, mice and rabbits is not injurious to trees. It will be remembered this point was raised two or three years ago, and has has been required to work it out to a final conclusion. One thing is certain, and that is that we were right in saying that peach trees are especially easily damaged by low temperatures if the soil is removed from around them in the fall and not carefully replaced. The damage was due to freezing and not to arsenate.

Finally, let us all take an active part in the modern movement for conservation, and do all we can to secure for ourselves and our descendents the benefits of what should be the results of our intelligent timely actions.

REPORT OF ORNITHOLOGIST.

By DR. JOSEPH KALBFUS.

VALUE OF BIRDS TO AGRICULTURE.

If human beings were able to foresee the result of the many mistakes they are making, or were likely to make, along life's journey, or were even so constructed that the same mistake would not be repeated, time and time again, many a rough place would be smoothed, to our great advantage. But, unfortunately for us, we appear to delight in ignorance and frequently fail to profit by either our own, or by the experience of those around us. Indeed, some of us seem to really believe there is virtue in the hackneyed expression that, "What one does not know will not hurt us," and are content to remain sheathed in our armor of ignorance. And while I might well say, this applies to men of every walk of life, I cannot help but feel that it prevails especially among that class known as farmers more than in any other class, many of whom are content to follow the ideas of their fathers regardless of consequences or results to them. They perhaps read the agricultural papers, and perhaps the bulletins sent out by the National or State authority, and that ends the matter insofar as they are concerned. The statement from Washington that agriculture lost last year, through ravages of insects, more than one billion dollars, I am confident failed to impress but a limited number of farmers in any way, except perhaps to cause a few to regret that they were farmers. The thought that the reader of the article might do something to correct existing conditions and improve possibilities for the future, in but few instances was given consideration, and in far less instances spurred any one into action. The majority are content to let things go as in the past, and so they move on into the future.

This gate or that gate has had but one hinge for weeks; this board on the barn or on the fence has been hanging by one nail for a long time. Let them hang! The thought that by fixing the hinge or driving a nail or two will improve conditions, to their benefit, apparently is passed without thought. They are content to walk in the footsteps of their fathers. They either do not understand, or they do not care, or both, and the days and the years roll away. To be sure they have eyes to see, but apparently see not. The potatoes are cleaned of bugs up to the time when the owner feels that further effort in that direction will not benefit the growing crop of that year, then he stops, never thinking of next year's crop. The nest of caterpillars is left undisturbed in the wild cherry tree, because it is a tree of no special value. The thought that perhaps these destroyers may migrate to beneficial trees, or may increase next year and become a pest everywhere, is given no consideration. The fact that the topmost shoot on the young pine tree here and there along the road or in the woods, is dead, has excited no special interest and caused no investigation. No one has exerted himself to know or understand why this is so. The majority are satisfied to rest content while the pine weevil increases, to the great injury of everybody, and so it appears to be all around us. Many even become angry because some one understanding the matter, some neighbor perhaps, chides them regarding their negligence. The old tree filled with holes drilled by members of the woodpecker family, and in which the chickadee and nuthatch and other winter birds find homes during the cold weather; in which the blue bird and other early spring migrants find shelter from killing storms, have been cut away and gone up the chimney in smoke. No bird house has been supplied to take the place of the old tree, and so the winter birds go elsewhere, and the early blue bird is compelled to sit out in the cold to freeze and die, while the farmer wonders why it is that his place is so over-run with destructive insects.

Many farmers fail to understand that each order of birds and frequently each species, is doing a special line of work peculiar to that order of species, that but few if any other birds engage in doing to any great extent; some on the ground, some on the trunks of trees, some in the branches, some in the air, some on the water, each one in its place doing a work that in the great majority of cases is beneficial to men, and that is done by but few other birds. This work is done in the majority of cases in broad daylight and right under our eye; still, many men fail to understand the special work of the birds around them. How many know that the Scarlet Tanger feeds almost exclusively in oaks and hickories on insects, of which there are more than three hundred species found in those trees? Or that the Cuckoo and Oriole feed largely on hairy caterpillars, that but few other birds will touch them at all? How many understand that the special work of the Hairy and Downy Woodpeckers is the destruction of the flat-headed and round-headed borer found in various trees, especially apple trees, and the codling moth, the insect that lays its eggs in the blossom end of the apple, that later on when hatched and in the larvae stage eats its way into the apple, to the great loss of the fruit grower, How many understand that the special work of the Wax-Wing, commonly called the Cherry Bird, is destroying the canker worm or measuring worm, the little caterpillar that frequently hangs in the air at the end of a long thread of web, and that eats the body out of the leaves of various trees? How many know that the special work of the robin in the springtime is the destruction of beetles and the larvae of beetles, which insects, especially the white grub, destroy the roots of strawberries and grasses, and renders the effort to raise either grasses or berries unprofitable. And so I might go on almost endlessly illustrating what each order, each family and each species of birds is doing for you, each one in its place doing a work that makes the crop of the farmer possible.

How many farmers know that the quail and the turkey and the Rose-breasted Grosbeck are the three birds of America that to any great extent feed on potato bugs? How many farmers know that potato bugs breathe through pores in the skin, and not through lungs, and that if those pores, called spirals in insects, are clogged through the use of slaked lime, or powdered Plaster of Paris, or flour or any other kind of dust, even road dust, the insect will die just as surely as it can be killed through the use of Paris green? How many farmers understand that when they put poison of any kind on potatoes, they are certainly placing sure death in the pathway of their best friends? How many farmers that you know feed the birds around the farm when they need help the most? How many do you know who will take a sack of grain on their backs when the ground is covered with ice and snow in all directions, and hunt for and feed the quail or other birds? Permitting quail to feed with one's chickens when they come that way, is not feeding the birds; work is what counts.

You remember the story of the merchant travelling from Jerusalem to Jericho, who was assaulted by thieves and left wounded by the wayside. You recall how the Priest, from whom, because of his profession, most was expected, passed on the other side. You recall how the Levite, another leader of public thought, did the same thing, and how, later on, a Samaritan, just a common man, one from whom nothing apparently was expected, came that way. You remember what he did, and the Master said, "Who was neighbor to that man?" Who is neighbor to the birds—not the one who professes to feel the most kindly towards them, but instead, the man who does something? A measure of grain placed where starving quail or any other birds can get it; a piece of suet or fresh pork nailed to a tree in the orchard, where the winter birds, such as the Hairy and Downy Woodpecker, and the Nuthatch, the Chickadee, the Kinglet, and other birds can get it, means more to them than does all the kind words or all the prayers that may be uttered by all the people of the country wherein the birds may be starving.

When the farmer, with his wife, his sons and his daughters, learns to understand the birds better, and to do what they can and should do for them, then indeed will benefit come to the land, that can come in no other way, and it can be truly said, "The Winter is over and gone and the voice of the turtle is heard in the land."

I beg the farmer and the farmer's family to study the habits and needs of our birds, his very best friends.

REPORT OF THE METEOROLOGIST.

By PROF. WILLIAM G. OWENS.

We are living at the bottom of an ocean of air which is believed to be from one to two hundred miles high. But in the upper heights the pressure is so much less than at the surface of the earth that the particles of which the air is composed would not act as they do at the surface.

The air is composed of about 76 per cent. of nitrogen, 23 per cent. of oxygen, and 1 per cent. of inert gases of the argon family, 0.04 per cent. of carbonic acid gas and smaller amounts of ammonia and other gases. In addition there are always present particles of dust, fine organic matter and germs of various kinds.

The chemical composition of the atmosphere is almost constant altho slight variations have been determined by Professor Morley. The variations in carbon dioxide and ammonia depend largely upon the surroundings under which the samples are taken. In districts where fires are numerous they are more abundant than in country districts or especially over the ocean. As plants use these chemicals in their growth their abundance makes quite a difference to the farmer. Farms over which the smoke from a manufacturing district is constantly blowing should be more productive than those which receive only pure air.

The dust particles, organic matter and germs which are found in the air also have an influence on the growth of plants. Anyone traveling a dusty road behind a high speed automobile cannot help but realize that there is a large amount of soil being carried up in the air but perhaps he does not realize that winds are also constantly transforming soil from one point to another, not in such large quantities at one time perhaps but almost constantly. Deserts are covered with sand because the wind has carried away the lighter particles of the soil and in many parts of the country the sand is moved, piled up in sand dunes which often encroach upon the cultivated lands covering up fields and orchards. This often occurs in the great northwest.

Rocks are often formed by drifting soil. The loess formation are of this origin. They are abundant in South America and in China these rocks have reached a thickness of 1,000 feet. This soil is all supposed to have been carried by the wind. Thousands of acres of China were once fertile which are now barren wastes because the forests were all removed and plants which would hold the moisture and the soil were not introduced and so at the present time hundreds of thousands, if not millions of tons of soil, the finest and best, from the surface of the land is usually being blown out to sea, with the result that the country is becoming more barren, if that is possible, from year to year.

The people in Pennsylvania who, perhaps, can best realize what the wind can do are the troopers who are now returning from the Texas frontier. They have been in sand storms where the face of the country seems to be changed by a single storm. The wind carved rocks as in "The Garden of the Gods" in Colorado and the balanced rocks found in many parts of the earth show what the wind can do.

If, therefore, the wind is such an important factor on the surface of the earth, how can the farmer use it to help him with his job? The power of the wind might be made to serve him as it does in Holland and other parts of the world, by the aid of windmills. This no doubt will be the case when the coal supply is further exhausted and the oil gives out. When the storage battery is further perfected it will be possible to light and heat the farm buildings besides doing much of the work on the farm by the power of the wind. That time may be very distant or it may come very soon. Many had hoped that the Edison storage battery would solve the question, but up to the present time the price seems to be prohibitive. Till that time comes about all that the farmer can expect of the wind is to help him pump water to supply the house and barn.

But the wind may also affect his crops. A three mile an hour breeze moves 15,840 cubic feet of air over each square foot of surface for each foot of height above the ground. Tho the air carries but a small amount of ammonium salts with such a large volume air passing one point, if the conditions are such that these salts can be appropriated by the growing plant, there must be some benefit derived. Keeping the ground covered tends to retain this fertility which is constantly passing over the fields.

Perhaps a greater reason for keeping the ground covered is to prevent particles of matter from being blown from the fields and to catch particles which are blown over the fields. Every observer has noticed how, during windy weather in the winter, when the ground is frozen dry, the ground is blown from around the roots of the wheat stocks, sometimes on exposed spots even killing the plant. What is true of soil movement in the wheat field is true all over the farm where the ground is uncovered. A second crop sown in the corn field will cover the ground during winter and prevent the loss of much fertility. But not only is the soil blown off and so lost to cultivation, as was said before, the air is constantly carrying some of the best fertilizing material in a very fine state of sub-division. If the motion of the air can be reduced so that it is almost quiet much of this will be deposited and so aid the fertility of the field.

Careful measurements have been made and amounts of dust and other substances found in the atmosphere. In England and Scotland during the winter of 1914-15 the amounts collected at 16 stations ranged from 532 tons per square mile, at Oldham, to 332 at Malvern in six months. That collected at Oldham analyzed 1.5 per cent. tar, 19 carbonaceous matter and 69 of ash. Near Pittsburgh the dust fall is reported to be 1,031 tons per square mile per annum. This should give something over 1.6 tons per acre.

As much of this material has fertilizing value, would it not pay the farmer to try to retain some of it on his fields? In the West wind-breakers are often used. Would it not pay the farmer in the East to try to conserve the fertility that the air is carrying over his farm in both gaseous and solid forms by reducing the velocity of the wind? Local conditions would determine the methods to be used but when an up-to-date farmer knows what goal he wishes to reach he can generally find the means of attaining it.

FEEDING STUFFS REPORT

By G. G. HUTCHISON.

As your Specialist on Feeding Stuffs, I beg leave to make the following report of our stewardship for the past year. This has been a year in which there were great demands for all lines of commercial feeds and it is well known to your minds that the price of cereals has increased all over the United States and that the scarcity of the crop in some sections has had its effect as well as the war in Europe, which has taken thousands of bushels of grains from our markets. This has caused manufacturers of commercial feeds to place, upon our markets, larger quantities than during any previous year. A few years ago when our Feeding Stuffs law was first placed upon the statute books, our people had very little knowledge of commercial feeds, in fact the manufacturers had very little idea of the importance of the business that they were engaging in.

At that time the manufacturers prepared their feeds in a very careless manner and gave little thought of the markets that would be theirs in the future. But these conditions have changed. Today the consumers and mixers of commercial feeding stuffs have secured up-to-date machinery and have also installed laboratories in which chemists from our best agricultural colleges are employed. The legitimate mixer of commercial feeds has his material analyzed before he purchases it and after it is mixed according to his formula, by having samples taken and analyzed.

These methods have placed the feed manufacturers on a new platform and our experience is that those who are engaged in the business, as I have just stated, have no trouble in complying with the Feeding Stuffs law of our Commonwealth. Our law has not been contested in the last year and we take great pride in stating that it is looked upon as the best law on the statute books of any state in the Union.

There is an effort being made, at the present time, by the feed manufacturers to have a uniform law passed in the United States. The uniform law, as presented, has some very good points in it and we do not wish to condemn it as a whole. But there are certain points that would conflict with the law, that we have on our statute books in Pennsylvania, that we think would not be beneficial to the consumers of commercial feeds in our Commonwealth. Our law prohibits the use of peanut shucks or hulls and also restricts the amount of fiber that shall be in a feed, that contains oat hulls or oat by-products. It also states that no ground corn cobs shall be mixed, with any feed except in a feed that is derived from corn and then the amount mixed shall not exceed a fiber content of 9.00 per cent. One move that the Feeding Stuffs Manufacturers have taken is the employment of our former Chief Chemist, Professor F. D. Fuller, as a scientific expert in the manufacturing of feeds. This shows that these people are trying to get nearer the scientific compounding of feeds with all indications that the manufacturer is getting nearer the consumer than in years gone by.

The molasses feeds that come into our markets are the greatest sellers that are produced and are bought more by our farmers especially in our dairy sections. We find that these feeds are free from adulteration except in the few cases in the pulverizing of the screenings. There are some whole weed seeds which pass through the pulverizer. When this is a large amount, we have been bringing prosecutions. We insist upon the manufacturers using greater care in their pulverizing the grain screenings.

One of the things that we are trying to impress upon our feed consumers throughout the State, is that they should raise their own alfalfa. As a practical farmer, I cannot see why people should buy alfalfa raised west of the Mississippi River when it can be raised upon the farms of Pennsylvania. Some scientific men claim that it cannot be successfully raised on our farms. This, I think, is a mistake.

In the valley, in which I live, I am safe in saying there are nearly 150 acres of alfalfa and one dairyman stated to me that he had 50 tons of good, clean alfalfa hay in his barn for his dairy cows and I believe that some of his neighbors have more. One dairyman told me that he had alfalfa to feed to his dairy cows most of the year, and he keeps 20 to 25 head. If this can be done on limestone land why cannot all farmers save a large amount of their feed bill by raising alfalfa.

The molasses feeds this year gave us some trouble on account of the low grade of molasses that was used in their preparation. In the middle of the summer, when the temperature was very high, we found a number of these feeds mouldy and in bad condition. Some of them were set aside and not offered for sale. Others were shipped out of the State and sold where the Feeding Stuffs law was not as restrictive as ours. We will say for the manufacturers that they did all they could to meet this condition and it was a case in which the Feed Control Officials had to use good, common sense in enforcement of the Feeding Stuffs law. We might have added a great burden on the manufacturers, but when they took it off of our markets we felt that our people were not suffering any loss at their hands.

There are sent to this office, at various times, samples of adulterants that some feed manufacturers wish to place in their feeds. When these are analyzed and found to be worthless we then refuse to allow feeds to be sold on our markets that contain these adulterants. This is a great safeguard to protect our people and it also saves us quite an amount of litigation. In the enforcement of the law, we bring prosecutions, the manufacturers of commercial feeds pay the fines for their consumers. In the past year there has not been a fine that has not been paid by the manufacturer. This protects the dealers and saves them from the law. The only sting is in the enforcement of the law that the dealers are subject to is that the informations are made against them. But as the cases are misdemeanors and as the feeds are exposed for sale in our own Commonwealth we cannot make the information outside of the State, hence, we are compelled to bring them against the dealers in the State, who offer adulterated feeds for sale. But the number of prosecutions has decreased because of the manufacturers complying with our law, which has become of great benefit to the dealers.

Another means of assisting the dealers in purchasing their feeds has been .the bulletin that is compiled by our Chief Chemist and distributed to all of the feed dealers and consumers throughout the Commonwealth. This places in his hands a bulletin that has the analysis, composition and guarantees by the manufacturers of the feeds that are offered in the markets. We find that in all feed stores that we visit that this bulletin is on the desk of the dealer and he states that when a feed salesman visits him to sell a certain variety of feed, he turns to our bulletin and there ascertains whether the salesman is telling him the truth or not.

Another safeguard that is drawn here for the protection of the dealers is that we require the registration of all feeds that are offered for sale in our State. In this registration is given the analysis for protein, fat and fiber and also a statement of the contents of the feed or what it is manufactured from. If the Chief Chemist has any doubt as to the purity of any of the substances entering into the feed, he then requires samples of the feed to be sent by the manufacturer to the Laboratory and he has it analyzed and if it complies with the statement of facts on the registration, the registration is then received. If it does not comply with it the registration is then returned with a statement of what the chemist found. In the past year there has been registered with us over 2,000 brands of feeds. This gives you some idea of the vast amount of different brands of feeds that are sold within our Commonwealth. In the last year the Department has made a request to our feed manufacturers to discontinue the use of a sliding scale in giving their analysis on sacks or packages. This scale as it was, previous to this request, gave the protein on a package running from say, 12.00 to 14.00 per cent. and the fat from 2.00 to 3.00 per cent. and the fiber from 9.00 to 12.00 per cent. This was misleading and the Secretary of Agriculture, the Chief Chemist and myself, after a conference, decided that it would be better to give the one figure indicating the correct amount of protein, fat and fiber in the goods. Without any litigation, the manufacturers are complying with this request, some of them having to reduce their analysis but yet coming within the law.

There is an organization known as the Feeding Stuffs Control Officials of the United States. This organization is made up of representatives from the different states that have Feeding Stuffs Control. They have what is known as an Executive Committee. To this is referred, among other subjects, the question of definitions. These definitions are not binding on any state but they are a guide not only to the other Feed Control Officials, but to the purchasers of concentrated feeds; and for your information I have here inserted these definitions knowing that this report will go in the annual report and it will reach a great number of persons engaged in the sale of feeding stuffs.

DEFINITIONS OF FEED MATERIALS.

CHOICE COTTONSEED MEAL must be finely ground, not necessarily bolted, perfectly sound and sweet in odor, yellow, free from excess of lint, and must contain at least 41 per cent. of protein.

PRIME COTTONSEED MEAL must be finely ground, not necessarily bolted, of sweet odor, reasonably bright in color, yellow, not brown or redish, free from excess of lint, and must contain at least 38.6 per cent. protein.

GOOD COTTONSEED MEAL must be finely ground, not necessarily bolted, of sweet odor, reasonably bright in color and must contain at least 36 per cent. protein.

COTTONSEED MEAL is a product of the cottonseed only, composed principally of the kernel with such portion of the hull as is necessary in the manufacture of oil; provided that nothing shall be recognized as cottonseed meal that does not conform to the foregoing definition and that does not contain at least 36 per cent. of protein.

COTTONSEED FEED is a mixture of cottonseed meal and cottonseed hulls, containing less than 36 per cent. protein.

COLD PRESSED COTTONSEED is the product resulting from subjecting the whole undecorticated cottonseed to the cold pressure process for the extraction of oil, and includes the entire cottonseed less the oil extracted.

GROUND COLD PRESSED COTTONSEED is the ground product resulting from subjecting the whole undecorticated cottonseed to the cold pressure process for the extraction of oil, and includes the entire ground cottonseed less the oil extracted.

OIL MEAL is the ground product obtained after the extraction of part of the oil by crushing, cooking and hydraulic pressure or by crushing, heating and the use of solvents from seeds which have been screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes. When used alone the term "Oil Meal" shall be understood to designate the product obtained from screened and cleaned flaxseed. When used to cover any other product the name of the seed from which it is obtained shall be prefixed to the words "Oil Meal."

OLD PROCESS OIL MEAL is the ground product obtained after extraction of part of the oil by crushing, cooking, hydraulic pressure from seeds screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes. When used alone the term "Old Process Oil Meal" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product the name of the seed from which it is obtained shall be prefixed to "Old Process Oil Meal."

NEW PROCESS OIL MEAL is the ground product obtained after extraction of part of the oil by crushing, heating and the use of solvents from seeds screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes. When used alone the term "New Process Oil Meal" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product the name of the seed from which it is obtained shall be prefixed to "New Process Oil Meal."

LINSEED MEAL is the ground product obtained after extraction of part of the oil from ground flaxseed screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes.

UNSCREENED FLAXSEED OIL FEED is the ground product obtained after extraction of part of the oil from unscreened flaxseed by crushing, cooking and hydraulic pressure or crushing, heating and the use of solvents. When sold without grinding, the unground product shall be designated as "Unscreened Flaxseed Oil Feed Cake."

DISTILLERS' DRIED GRAINS are the dried residue from cereals obtained in the manufacture of alcohol and distilled liquors. The product shall bear the designation indicating the cereal predominating.

BREWERS' DRIED GRAINS are the properly dried residue from cereals obtained in the manufacture of beer.

MALT SPROUTS are the sprouts of the barley grain. If the sprouts are derived from any other malted cereal, the source must be designated.

CORN BRAN is the outer coating of the corn kernel.

CORN FEED MEAL is the sifting obtained in the manufacture of cracked corn and table meal from the whole grain.

CORN GLUTEN MEAL is that part of commercial shelled corn that remains after the separation of the larger part of the starch, the germ and the bran by the processes employed in the manufacture of cornstarch and glucose. It may or may not contain corn solubles.

CORN GLUTEN FEED is that portion of commercial shelled corn that remains after the separation of the larger part of the starch and the germ by the process employed in the manufacture of cornstarch and glucose. It may or may not contain corn solubles.

GRITS are the hard, flinty portions of Indian corn without hulls and germ.

HOMINY MEAL, HOMINY FEED, OR HOMINY CHOP is a mixture of the bran coating, the germ and a part of the starchy portion of the corn kernel obtained in the manufacture of hominy grits for human consumption.

CORN GERM MEAL is a product of the manufacture of starch, glucose and other corn products and is the germ layer from which a part of the corn oil has been extracted.

RED DOG is a low grade wheat flour containing the finer particles of bran.

SHORTS or STANDARD MIDDLINGS are the fine particles of the outer and inner bran separated from bran and white middlings.

WHEAT WHITE MIDDLINGS or WHITE MIDDLINGS are that part of the offal of wheat intermediate between shorts or standard middlings and red dog.

SHIPSTUFF or WHEAT MIXED FEED is a mixture of the products other than the flour obtained from the milling of the wheat berry.

WHEAT BRAN is the coarse outer coatings of the wheat berry obtained in the usual commercial milling process from wheat that has been cleaned and scoured.

WHEAT BRAN WITH MILL RUN SCREENINGS is pure wheat bran plus the screenings which were separated from the wheat used in preparing said bran.

WHEAT BRAN WITH SCREENINGS NOT EXCEEDING MILL RUN is either wheat bran with the whole mill run of screenings or wheat bran with a portion of the mill run of screenings, provided that such portion is not an inferior portion thereof.

OAT MIDDLINGS are the floury portion of the oat groat obtained in the milling of rolled oats.

OAT SHORTS are the covering of the oat grain lying immediately inside the hull, being a fuzzy material carrying with it considerable portions of the fine floury part of the groat obtained in the milling of rolled oats.

OAT GROATS are the kernels of the oat berry with the hulls removed.

OAT HULLS are the outer chaffy coverings of the oat grain.

CLIPPED OAT BY-PRODUCTS (term oat clippings not recognized) is the resultant by-product obtained in the manufacture of clipped oats. It may contain light, chaffy material broken from the ends of the hulls, empty hulls, light, immature oats and dust. It must not contain an excessive amount of oat hulls.

BUCKWHEAT SHORTS OR BUCKWHEAT MIDDLINGS are that portion of the buckwheat grain immediately inside of the hull after separation from the flour.

ALFALFA MEAL is the entire alfalfa hay ground, and does not contain an admixture of ground alfalfa straw or other foreign materials.

CHOP is a ground or chop feed composed of one or more different cereals or by-products thereof. If it bears a name descriptive of the kind of cereals, it must be made exclusively of the entire grains of those cereals.

SCREENINGS are the smaller imperfect grains, weed seeds and other foreign materials having feeding value, separated in cleaning the grain.

MEAL is the clean, sound, ground product of the entire grain, cereal or seed which it purports to represent:

FLAX PLANT BY-PRODUCT is that portion of the flax plant remaining after the separation of the seed, the bast fibre and a portion of the shives, and consists of flax shives, flax pods, broken and immature flax seeds and the cuticle tissue of the stem.

RICE BRAN is the cuticle beneath the hull.

RICE HULLS are the outer chaffy coverings of the rice grain.

RICE POLISH is the finely powdered material obtained in polishing the kernel.

BLOOD MEAL is ground dried blood.

OIL CAKE is the residual cake obtained after extraction of part of the oil by crushing, cooking and hydraulic pressure from seeds screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes. When used alone the term "Oil Cake" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product, the name of the seed from which it is obtained shall be prefixed to "Oil Cake."

GROUND OIL CAKE is the product obtained by grinding oil cake. When used alone, the term "Ground Oil Cake" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product the name of the seed from which it is obtained shall be prefixed to "Ground Oil Cake."

INGREDIENTS OF UNSCREENED FLAXSEED OIL FEED—Ground cake from partially extracted flaxseed and foreign seeds (wheat, wild buckwheat, pigeon grass, wild mustard, etc.).

SCREENINGS OIL FEED is the ground product obtained after extraction of part of the oil by crushing, cooking and hydraulic pressure, or by crushing, heating and the use of solvents from the smaller imperfect grains, weed seeds and other foreign materials having feeding value separated in cleaning the grain. The name of the grain from which the screenings are separated shall be prefixed to "Screenings Oil Feed."

GROUND FLAXSEED OR FLAXSEED MEAL is the product obtained by grinding flaxseed which has been screened and cleaned of weed seeds and other foreign material by the most improved commercial processes.

YEAST OR VINEGAR DRIED GRAINS are the properly dried residue from the mixture of cereals, malt and malt sprouts (sometimes cottonseed meal) obtained in the manufacture of yeast or vinegar, and consist of corn or corn and rye from which most of the starch has been extracted, together with malt added during the manufacturing process to change the starch to sugars, and malt sprouts (sometimes cottonseed meal) added during the manufacturing process to aid in filtering the residue from the wort and serve as a source of food supply for the yeast.

PALM KERNEL OIL MEAL is the ground residue from the extraction of part of the oil by pressure or solvents from the kernel of the fruit of Elaeis guineensis or Elaeis malanococca.

IVORY NUT MEAL is ground ivory nuts.

TENTATIVE DEFINITIONS

CORN FEED MEAL is the by-product obtained in the manufacture of cracked corn, with or without aspiration products added to the siftings, and is the by-product obtained in the manufacture of table meal from the whole grain by the non-degerminating process.

MEAT SCRAP AND MEAT MEAL are the ground residues from animal tissues exclusive of hoof and horn. If they contain more than 10 per cent of phosphoric acid (P_2O_5) they must be designated Meat and Bone Scrap and Meat and Bone Meal. If they bear a name descriptive of their kind, composition or origin, they must correspond thereto.

DIGESTER TANKAGE is the residue from animal tissue, exclusive of hoof and horn, specially prepared for feeding purposes by tanking under live steam, drying under high heat, and suitable grinding. If it contains more than 10 per cent of phosphoric acid (P_2O_5) it must be designated Digester Meat and Bone Tankage.

PEANUT OIL CAKE is the residue after the extraction of part of the oil by pressure or solvents from peanut kernals.

PEANUT OIL MEAL is the ground residue after the extraction of part of the oil from peanut kernels.

UNHULLED PEANUT OIL FEED is the ground residue obtained after extraction of part of the oil from whole peanuts, and the ingredients shall be designated Peanut Meal and Hulls.

At this Annual Meeting we met with members of the United States Department of Agriculture. They are engaged in the same line of work that our officials are in this State. They gave us the benefit of their work for the year and we also get in touch with men engaged in the feed control from different states. The majority of those who attend this convention from the different states are chemists who are versed in the examination of feeds. For years it has been a great question with those who purchase by-product feeds, what amount of them are digestible.

Some ten years ago I wrote to the Experiment Station of the United States asking if they were running any digestible tests on commercial feeds. I found very few that were interested in this great subject. But as time has rolled on I find that some tests have been made and for your benefit I have inserted in this report a table giving these tests and giving credit to the different persons who have furnished this information. At your leisure I would like you to make an examination of the following table and see if it will not be of some benefit to you:

TABLE IV.—AVERAGE COMPOSITION, DIGESTION, COEFFICIENTS AND ENERGY VALUES OF FEEDING STUFFS.

Name of Feeding Stuffs.	Composition.						Digestion Coefficients.				Therms of energy.
					Carbohydrates.				Carbohydrates.		
	Water.	Ash.	Protein.	Fat.	Fiber.	Nitrogen — free extract.	Protein.	Fat.	Fiber.	Nitrogen — free extract.	
	%	%	%	%	%	%	%	%	%	%	
Alfalfa meal,	8.4	7.4	14.3	2.2	25.0	42.7	74	41	....	*57	34.41
Barley,	10.9	2.4	12.4	1.8	2.7	69.8	70	89	50	92	80.75
Barley meal,	11.9	2.6	10.5	2.2	6.5	63.3	70	89	....	*90	......
Barley screenings,	12.2	3.6	12.3	2.8	7.3	61.8	....	....	....	......	......
Beet pulp, dried,	8.0	5.4	9.5	0.4	15.4	61.3	64	....	....	*89	60.10
Brewers' dried grains,	8.2	3.6	19.9	5.6	11.0	51.7	79	91	53	59	60.01
Broom corn seed,	12.7	3.4	10.2	3.0	7.1	63.6	73	97	....	*68	......
Buckwheat,	12.6	2.0	10.0	2.2	8.7	64.5	77	82	....	*67	......
Buckwheat bran,	10.5	3.0	12.4	3.3	31.9	38.8	60	58	....	*43	......
Buckwheat hulls,	13.2	2.2	4.6	1.1	43.5	35.3	46	55	....	*35	......
Buckwheat middlings,	13.2	4.8	28.9	7.1	4.1	41.9	76	76	....	*73	75.92
Buckwheat shorts,	11.1	5.1	27.1	7.6	8.3	40.8	78	72	....	*68	......
Cocoa hulls,	4.5	13.9	18.5	3.5	16.7	42.9	12	100	51	73	......
Cocoanut oil cake meal,	10.3	5.9	19.7	11.0	14.4	38.7	79	95	....	*72	......
Cocoanut shells, ground,	8.7	0.6	1.3	0.4	49.5	39.5	....	....	....	......	......
Corn,	10.9	1.5	10.4	5.0	2.0	70.2	76	86	58	93	88.84
Corn bran,	9.1	1.3	9.0	5.8	12.7	62.0	82	79	....	*80	......
Corn cob,	10.7	1.4	2.4	0.5	30.1	54.9	17	50	65	60	......
Corn and cob meal,	15.1	1.5	8.5	3.5	6.6	64.8	52	84	45	88	72.05
Corn germ meal,	8.1	1.3	11.1	7.1	9.9	62.5	81	87	....	*85	......
Corn gluten feed,	8.5	1.7	26.2	3.1	7.2	53.3	85	83	72	87	79.32
Corn gluten meal,	8.2	0.9	29.8	11.8	3.3	46.5	88	93	....	*87	88.80
Corn meal,	15.0	1.4	9.2	3.8	1.9	68.7	60	92	....	*93	......
Corn oil cake meal,	7.5	2.5	28.0	11.5	7.4	43.1	....	....	....	......	......
Cottonseed,	10.3	3.5	18.4	19.9	23.2	24.7	68	87	76	50	......
Cottonseed hulls,	11.1	2.8	4.2	2.2	46.3	33.4	71	77	....	*42	......
Cottonseed meal,	7.6	7.2	41.0	8.1	9.2	26.9	88	93	32	64	84.20
Distillers' dried grains (from corn),	6.4	1.7	30.4	12.7	11.0	37.8	73	95	....	*85	79.23
Distillers' dried grains (from rye),	6.8	1.8	18.8	8.4	13.2	51.0	60	....	....	......	60.93
Dried blood,	8.5	4.7	84.3	2.5	......	......	72	92	....	......	......
Fish scrap,	10.8	29.2	48.4	11.6	......	......	91	89	....	......	......
Flaxseed,	9.2	4.3	22.6	33.7	7.1	23.2	91	86	61	55	......
Flaxseed screenings,	5.3	11.7	17.2	15.7	11.1	39.0	....	....	....	......	......
Flax plant refuse,	5.9	6.9	6.8	3.6	42.6	34.2	....	....	....	......	......
Hominy feed,	11.1	2.5	9.8	8.3	3.8	64.5	77	82	....	*81	84.00
Ivory nut meal,	8.2	1.2	4.7	0.9	8.2	76.8	....	....	....	......	......
Kaffir corn,	9.3	1.5	9.9	3.0	1.4	74.9	79	70	....	*75	......
Linseed oil meal (new process),	10.1	5.8	33.2	3.0	9.5	38.4	85	93	74	88	74.67
Linseed oil meal (old process),	9.2	5.7	32.9	7.9	8.9	35.4	89	89	57	78	78.92
Malt sprouts,	10.2	5.7	23.2	1.7	10.7	48.5	80	100	34	69	46.32
Meat scraps,	10.7	4.1	71.2	13.7	......	0.3	93	98	....	......	......
Millet seed,	14.0	3.3	11.8	4.0	9.5	57.4	75	80	....	*67	......
Molasses (cane black-strap),	22.4	9.3	2.4	......	......	65.9	....	....	....	66	......
Molasses (beet),	20.8	10.6	9.1	......	......	59.5	....	....	....	60	......
Oats,	11.0	3.0	11.8	5.0	9.5	59.7	78	83	20	76	66.27
Oat bran,	7.1	5.4	12.4	5.5	16.7	52.9	....	....	....	......	......
Oat clips,	6.7	11.5	9.4	3.8	21.3	47.3	....	....	....	......	......
Oat hulls,	7.3	6.7	3.3	1.0	29.7	52.1	39	60	....	*48	......
Oat shorts,	7.7	3.7	16.0	7.1	6.1	59.4	78	39	....	*72	......
Pea meal,	10.0	2.6	18.9	1.6	17.5	49.4	83	56	....	*76	71.75
Peanut bran,	9.6	3.5	17.1	25.4	10.6	33.8	....	....	....	......	......
Peanut hulls,	9.0	3.4	6.6	1.6	64.3	15.1	71	91	....	*20	......
Peanut meal,	10.7	4.9	47.6	8.0	5.1	23.7	90	86	....	*79	......
Rice,	12.4	0.4	7.4	0.4	0.2	79.2	65	75	....	*91	......
Rice bran,	9.7	10.0	12.1	8.8	9.5	49.9	44	83	....	*76	......
Rice hulls,	9.0	18.3	3.5	0.5	41.9	26.8	23	40	....	*21	......
Rice meal,	10.2	8.1	12.0	13.1	5.4	51.2	63	85	26	86	......

TABLE IV—Concluded.

Name of Feeding Stuffs.	Composition.						Digestion Coefficients.				Therms of energy.
					Carbohydrates.				Carbohydrates.		
	Water.	Ash.	Protein.	Fat.	Fiber.	Nitrogen — free extract.	Protein.	Fat.	Fiber.	Nitrogen — free extract.	
	%	%	%	%	%	%	%	%	%	%	
Rice polish,	10.0	6.7	11.7	7.3	6.3	58.0	77	89	....	*8	......
Rye,	11.6	1.9	10.6	1.7	1.7	72.5	93	65	....	*91	81.72
Rye bran,	11.6	3.6	14.7	2.8	3.5	63.8	78	71	....	*75	56.66
Rye shorts,	9.3	5.9	18.0	2.8	5.1	59.9	66	57	....	*69	......
Soja (Soy) bean seed,	10.8	4.7	34.0	16.9	4.8	28.8	87	85	....	*66	......
Sorghum seed,	12.8	2.1	9.1	3.6	2.6	69.8	77	86	....	*72	......
Sunflower oil cake,	10.8	6.7	32.8	9.1	13.5	27.1	95	97	....	*48	......
Sunflower seed,	8.6	2.6	16.3	21.2	29.9	21.4	74	89	....	*41	......
Tankage,	7.0	18.7	44.1	13.6	7.2	9.4	....	....	....	......	......
Wheat,	10.5	1.8	11.9	2.1	1.8	71.9	86	81	....	*94	82.63
Wheat bran,	11.9	5.8	15.4	4.0	9.0	53.9	79	68	22	69	48.23
Wheat low grade flour middlings,	12.0	2.0	18.0	3.8	0.9	63.3	46	24	....	*98	......
Wheat middlings,	11.6	2.9	12.5	3.0	4.9	65.1	78	73	....	*73	......
Wheat screenings,	11.6	2.9	12.5	3.0	4.9	65.1	78	73	....	*73	......
Wheat shorts,	11.8	4.6	14.9	4.5	7.4	56.8	82	84	....	*78	......
Yeast dried grains,	6.8	3.7	20.3	7.8	17.4	44.0	....	....	....	......	......
Roughage.											
Barley straw,	14.2	5.7	3.5	1.5	36.0	39.0	20	42	56	54	......
Buckwheat straw,	9.9	5.5	5.2	1.3	43.0	35.1	....	....	....	......	......
Canada blue grass,	14.0	4.8	5.9	0.9	32.3	42.1	42	33	....	*65	......
Clover hay, alsike,	9.7	8.3	12.8	2.9	25.6	40.7	66	50	53	71	......
Clover hay, crimson,	9.6	8.6	15.2	2.8	27.2	36.6	69	44	45	62	......
Clover hay, red,	15.3	6.2	12.3	3.3	24.8	38.1	49	43	48	58	24.74
Corn fodder,	42.2	2.7	4.5	1.6	14.3	34.7	55	74	65	73	12.44
Corn silage,	79.1	1.4	1.7	0.8	6.0	11.0	53	87	....	*66	16.56
Corn stover,	40.5	3.4	3.8	1.1	19.7	31.5	45	62	67	61	26.53
Kentucky blue grass hay,	21.2	6.3	7.8	3.9	23.0	37.8	62	51	....	*61	......
Oat straw,	9.2	5.1	4.0	2.3	37.0	42.4	30	33	54	44	21.21
Orchard grass hay,	9.9	6.0	8.1	2.6	32.4	41.0	60	54	....	*58	......
Red top hay,	8.9	5.2	7.9	1.9	28.6	47.5	61	53	....	*62	......
Rye straw,	7.1	3.2	3.0	1.2	38.9	45.6	21	32	60	37	20.87
Timothy hay,	13.2	4.4	5.9	2.5	29.0	45.0	48	57	52	59	33.56
Wheat straw,	9.6	4.2	3.4	1.3	38.1	43.4	11	31	52	38	16.56

Above figures from W. A. Henery's "Feeds and Feeding," W. H. Jordan's "The Feeding of Animals," J. E. Hallingan's "Stock Feeds and Feeding," Bulletin No. 114, Penna. Experiment Station, Bulletin No. 152, Mass. Experiment Station, Farmers' Bulletin No. 346, U. S. Dept. of Agriculture and Feeding Stuffs reports of Penna. Department of Agriculture.

*Digestion co-efficients for carbohydrates (nitrogen-free extract and crude fiber estimated together.)

I hope to see the day that some of the Experimental Stations will take up the question of the digestibility of commercial feeds. Our own Station has been conducting digestible tests on ground cereals but do not give as much attention, I think, to this great subject of the commercial feeds as should be given. This is not a criticism, it is only a suggestion. I am glad to see that some of the Stations are giving some attention to the question of proprietary calf meals. I received a bulletin a few days ago from one of the stations giving a large number of experiments. This I was delighted to see as it will be of great benefit to those engaged in raising calves in which they do not have the milk supply that they should have. The Proprietary Poultry Foods that are upon the market are the ones in which the people should take a great interest. I am not here to condemn them. I know they have a place on our markets, but the price that they command is the question that should enter into their consumption.

Before, in speaking of this question, I advocated the use of good, clean, red wheat. But as wheat has gotten to a price ranging from $1.80 to $1.90 a bushel, to some it might work as prohibitory. But if you will take the increase in price of poultry foods you will find that they increase in the proportion of the price of wheat. Now if the manufacturers of poultry foods would use good, clean wheat in their foods they would be entitled to the same increase. But when they use a cheap grade of wheat or a grade of wheat that has been damaged then they should not receive the same proportion of increase that they do. We have endeavored throughout the year to keep the whole weed seeds out of the chicken feeds and we have been successful except in a few cases. Some of the manufacturers sell a nice, clean chicken feed made up of wheat, corn, cracked corn and other cereals, but a few will persist in mixing almost any refuse together and calling it a chicken feed.

In the rearrangement of our work last year by Secretary Patton we have had two men taking samples of feeding stuffs and visiting the dealers throughout the State the last year. Part of their time is taken up with the fertilizer work, a portion with the paint, seed and lime work, and the balance securing feeding stuffs work.

To Mr. John F. St. Clair there were assigned thirty-nine counties of the State, part of which is in the central and balance in the western part of Pennsylvania, and to Mr. W. John Stiteler, twenty-eight counties, including the eastern and portion of the middle section of the State. These gentlemen have given their very best effort to this work and have been faithful in distributing information, by answering questions in regard to the law and explaining it to the dealers, securing the names of dealers that wished our bulletins and in securing samples. Mr. Stiteler, in the twenty-eight counties assigned to him, secured 679 samples, which were forwarded to the Laboratory for analysis. He also visited a large number of dealers, in which he did not take samples as it would be a duplication. He also spent about six weeks in Philadelphia on special investigation, on the feeds that were coming into that market. This investigation proved very profitable to the Department, and was a means of furnishing information to those engaged in the sale of concentrated feeds in Philadelphia.

In the thirty-nine counties that Mr. St. Clair visited, he secured 618 samples. This covered all of the various kinds of feeds that are on the markets. He also visited a large number of places in which he did not take samples as it would be a duplication.

In these gentlemen's reports they state that the dealers are enthusiastically in favor of the Feeding Stuffs law. I want to here publicly thank these two faithful agents for the manner in which they have discharged their duties in the last year. I here give the table giving the towns visited by Mr. St. Clair in his work:

(St. Clair).

County Visited.	Towns Visited.	Number of Samples Collected.	Total Number Collected.
Adams,	Gettysburg,	5	
	New Oxford,	7	
	Idaville,	0	
	Biglerville,	0	
	Total,		12
Allegheny,	Pittsburgh,	12	
	Pitcairn,	4	
	Braddock,	2	
	McKeesport,	7	
	Wilkinsburg,	5	
	Etna,		
	Sharpsburg,	3	
	Oakdale.	1	
	Castle Shannon,	4	
	Homestead,	2	
	Homestead No. 1,	3	
	Turtle Creek,	3	
	Hays,	4	
	Carnegie,	0	
	East Liberty,	0	
	Tarentum,	0	
	Bridgeville,	0	
	Duquesne,	0	
	Wilmerding,	0	
	Total,		50
Armstrong,	Leechburg,	5	
	Vandergrift,	0	
	Kittanning,	14	
	Ford City,	0	
	Parkers Landing,	0	
	Kelly,	0	
	Templeton,	0	
	Total,		19
Beaver,	Rochester,	6	
	Beaver Falls,	4	
	Monaca,	6	
	New Brighton,	6	
	West Bridgewater,	3	
	Freedom,	3	
	Aliquippa,	0	
	Woodlawn,	0	
	Total,		28

(St. Clair—Continued).

County Visited.	Towns Visited.	Number of Samples Collected.	Total Number Collected.
Bedford,	Bedford,	8	
	Everett,	1	
	Saxton,	0	
	Hopewell,	0	
	Hindman,	0	
	Total,		9
Blair,	Bellwood,	3	
	Tyrone,	6	
	Altoona,	24	
	Hollidaysburg,	3	
	Martinsburg,	0	
	Roaring Springs,	0	
	Total,		36
Butler,	Evans City,	4	
	Harmony,	4	
	Mars,	4	
	Butler,	9	
	Marwood,	0	
	Euclid,	0	
	Valencia,	0	
	Zelienople,	0	
	Isle,	0	
	Chicora,	0	
	Sarver,	0	
	Total,		21
Cameron,	Emporium,	4	
	Driftwood,	0	
	Total,		4
Cambria,	Johnstown,	27	
	Barnesboro,	0	
	Ebensburg,	2	
	Spangler,	3	
	South Fork,	0	
	Portage,	0	
	Cresson,	0	
	Patton,	0	
	Carrolltown,	0	
	Wilmore,	0	
	Gallitzin,	0	
	Hastings,	0	
	Total,		32
Center,	Bellefonte,	3	
	Howard,	3	
	Philipsburg,	13	
	Center Hall,	0	
	Unionville,	0	
	Total,		19
Clarion,	Clarion,	8	
	New Bethlehem,	0	
	Summerville,	0	
	Total,		8

(St. Clair—Continued).

County Visited.	Towns Visited.	Number of Samples Collected.	Total Number Collected.
Clearfield,	DuBois,	8	
	Clearfield,	5	
	Morrisdale,	1	
	Osceola Mills,	0	
	Munson,	0	
	Madera,	0	
	Total,		14
Clinton,	Lock Haven,	8	
	Mill Hall,	0	
	Renovo,	0	
	Total,		8
Crawford,	Linesville,	5	
	Meadville,	0	
	Jamestown,	0	
	Stoneboro,	0	
	Total,		5
Cumberland,	Shippensburg,	2	
	Newville,	3	
	Mechanicsburg,	8	
	Carlisle,	8	
	Mt. Holly Springs,	6	
	Middlesex,	0	
	Total,		27
Elk,	St Marys,	8	
	Ridgway,	4	
	Johnsonburg,	0	
	Total,		12
Erie,	Erie, Wesleyville, Bellevalley,	15	
	Union City,	0	
	Corry,	0	
	North Girard,	0	
	Total.		15
Fayette,	Connellsville,	2	
	Dunbar,	1	
	Fairchance,	4	
	South Brownsville,	2	
	Uniontown,	10	
	Bellevernon,	2	
	Brownsville,	0	
	Masontown,	0	
	Total,		21
Forest,	Tionesta,	3	
	Hickory,	0	
	Total,		3
Franklin,	Chambersburg,	11	
	Williamson,	5	
	Marion,	0	
	Greencastle,	0	
	Lemasters,	0	
	Mercersburg,	0	
	Fort Loudon,	0	
	Scotland,	0	
	Total,		16

(St. Clair—Continued).

County Visited.	Towns Visited.	Number of Samples Collected.	Total Number Collected.
Fulton,	McConnellsburg,		1
Greene,	Waynesburg,	1	
	Rice's Landing,	0	
	Total,		1
Huntingdon,	Huntingdon,	8	
	Mapleton,	4	
	Mt. Union,	0	
	Petersburg,	0	
	Total,		12
Indiana,	Homer City,	5	
	Indiana,	5	
	Clymer,	0	
	Ernest,	0	
	Creekside,	0	
	Blairsville,	0	
	Saltsburg,	0	
	Black Lick,	0	
	Total,		10
Jefferson,	Brookville,	7	
	Lindsey,	1	
	Reynoldsville,	6	
	Punxsutawney,	3	
	Sykesville,	0	
	Prescottville,	0	
	Big Run,	0	
	Falls Creek,	0	
	Brockwayville,	0	
	Total,		17
Juniata,	Mifflin,	2	
	Port Royal,	0	
	Total,		2
Lawrence,	New Castle,	15	
	Ellwood City,	4	
	New Wilmington,	0	
	Mahoningtown,	0	
	Total,		19
Mercer,	Greenville,	2	
	Sharon,	4	
	Farrell,	6	
	Pulaski,	0	
	Wheatland,	0	
	West Middlesex,	0	
	Mercer,	0	
	Grove City,	0	
	Total,		12
Mifflin,	Lewistown,	2	
	Yeagertown,	6	
	McVeytown,	2	
	Reedsville,	0	
	Total,		10

(St. Clair—Continued).

County Visited.	Towns Visited.	Number of Samples Collected.	Total Number Collected.
McKean,	Bradford,	12	
	Kane,	7	
	Smethport,	8	
	Port Allegany,	2	
	Eldred,	0	
	Mt. Jewett,	0	
	Total,		29
Perry,	Millerstown,	2	
	Newport,	4	
	Duncannon,	0	
	Marysville,	0	
	Total,		6
Potter,	Coudersport,	6	
	Ulysses,	0	
	Total,		6
Sndyer,	Middleburg,	0	
	Selinsgrove,	0	
	Swineford,	0	
	Total,		0
Somerset,	Windber,	8	
	Somerset,	11	
	Rockwood,	2	
	Holsopple,	0	
	Meyersdale,	0	
	Total,		21
Union,	Mifflinburg,	4	
	Lewisburg,	8	
	West Milton,	0	
	Total,		12
Venango,	Oil City,	4	
	Franklin,	4	
	Silverly,	0	
	Polk,	0	
	Total,		8
Warren,	Warren,	5	
	Youngsville,	0	
	Columbus,	0	
	Total,		5
Washington,	Midway,	4	
	California,	2	
	Monongahela,	6	
	Fredericktown,	5	
	Charleroi,	3	
	Washington,	15	
	Donora,	0	
	Canonsburg,	0	
	Huston,	0	
	Total,		35

(St. Clair—Continued).

County Visited.	Towns Visited.	Number of Samples Collected.	Total Number Collected.
Westmoreland,	Vandergrift,	0	
	New Kensington,	4	
	Greensburg,	5	
	Latrobe,	5	
	Manor,	3	
	Mt. Pleasant,	2	
	Scottdale,	4	
	New Stanton,	3	
	Parnassus,	6	
	Monessen,	6	
	Jeanette,	8	
	Derry,	2	
	Irwin,	2	
	Vandergrift Heights,	3	
	New Salem,	0	
	Tarrs,	0	
	Penn,	0	
	Bolivar,	0	
	Total,		53

I here give the table giving the towns visited by Mr. Stiteler in his work:

(Stiteler).

County Visited.	Towns Visited.	Number of Samples Collected.	Total Number Collected.
Bradford,	Troy,	7	
	Canton,	8	
	Sayre,	2	
	Athens,	2	
	Towanda,	19	
	New Albany,	3	
	Total,		41
Bucks,	Sellersville,	9	
	Doylestown,	8	
	Quakertown,	14	
	Chalfonte,	3	
	Perkasie,	7	
	South Perkasie,	3	
	Total,		44
Chester,	Paoli,	7	
	Berwyn,	6	
	Coatesville,	15	
	Malvern,	8	
	Pomeroy,	1	
	Toughkenamon,	3	
	Oxford,	3	
	Chadds Ford Junction,	2	
	West Chester,	11	
	Honeybrook,	3	
	Downingtown,	3	
	Total,		62
Columbia,	Bloomsburg,		1
Delaware,	Wayne,	8	
	Rosemont,	4	
	Chadds Ford,	0	
	Brandywine Summit,	0	
	Total,		12
Lackawanna,	Scranton,	21	
	Carbondale,	8	
	Total,		29
Lancaster,	Florin,	1	
	Leola,	2	
	Terre Hill,	1	
	Lancaster,	14	
	Witmer,	2	
	Bird-in-hand,	2	
	Christiana,	2	
	Royerstown,	2	
	Total,		26
Lebanon,	Annville,	1	
	Prescott,	1	
	Lawn,	1	
	Lebanon,	4	
	Total,		7

(Stiteler—Continued).

County Visited.	Towns Visited.	Number of Samples Collected.	Total Number Collected.
Lehigh,	Allentown,	7	
	Emaus,	3	
	Coopersburg,	3	
	Centre Valley,	0	
	South Bethlehem,	5	
	Total,		18
Luzerne,	Wilkes-Barre,	21	
	Ashley,	0	
	Edwardsville,	0	
	Total,		21
Lycoming,	Williamsport,	8	
	Montoursville,	3	
	Total,		11
Montgomery,	Lansdale,	12	
	Colmar,	5	
	West Point,	7	
	Telford,	7	
	Souderton,	2	
	North Wales,	1	
	Hatfield,	9	
	Total,		43
Monroe,	Stroudsburg,	5	
	East Stroudsburg,	7	
	Total,		12
Northampton,	Bethlehem,	4	
	Easton,	14	
	Total,		18
Northumberland,	Sunbury,	12	
	Northumberland,	0	
	Total,		12
Philadelphia,	Philadelphia,		0
Sullivan,	Dushore,		1
Susquehanna,	Montrose,	12	
	Hopbottom,	4	
	Brooklyn,	0	
	Total,		16
Tioga,	Wellsboro,	15	
	Knoxville,	6	
	Westfield,	7	
	Elkland,	3	
	Tioga,	5	
	Mansfield,	6	
	Total,		42
Wayne,	Honesdale,	10	
	Hawley,	2	
	Total,		12
Wyoming,	Meshoppen,	0	
	Laceyville,	6	
	Skinners Eddy,	8	
	Tunkhannock,	6	
	Total,		20
York,	Dillsburg,		0

A large number of special samples have been sent to the Department for analysis in the last year. As you recall the law provided that where a citizen of the Commonwealth wishes to have an analysis made of feeding stuffs they then have the same made at the Department of Agriculture by sending the sample together with a fee of $1.00. This fee goes into the State Treasury and the Department is in no way benefited by it.

This has been a year of progress in the Laboratory. We are now situated on North Street, in the new Capitol Park zone in what is known as the Day School Building. The Laboratories have been fitted up not only to do the work required under the Commercial Feeding Stuffs law, but also to make the analyses of Fertilizers, Paints, Oils, Seeds, and Lime, as required under the different acts of Assembly, and with all the room that we seemed to have had at the beginning, the work that has been placed upon us by the Legislature under these different acts of Assembly, has so increased the labors of the Department that we find that we are now crowded for space. We would be very much pleased to have not only the members of the Board but also visitors to visit the Laboratory and see the plant in working order. There are thirteen persons employed, all doing their very best along this line of work. We hope to see the day that the Commonwealth of Pennsylvania will erect a Laboratory building large enough to accommodate the work that has been placed upon the Department under the different laws.

Because of the fact that the appropriations for all lines of work were less than necessary to properly carry out the provisions of the various control laws, I will call the attention of the Legislative Committee of the Board for the need of increased appropriations, not only for feeding stuffs but for the other lines of work.

I want to thank the members of this Board for the support that they have given us in our labors in their different localities, and say to you and through you to your friends that if you will adopt the text that we laid down to you in the beginning of our labors in this Bureau, to buy feed on its high protein, high fat and low fiber analyses, that our labors will not be in vain.

Thanking Secretary Patton and our Chief Chemist, Mr. Kellogg, and all those connected with our work for their many kindnesses throughout the year.

REPORT OF THE ECONOMIC GEOLOGIST

By BAIRD HALBERSTADT, F. G. S.

During the year just closed, there have been but few samples of rocks and minerals sent to me by the farmers of the State for examination. Such as have been submitted have been of little or no economic importance. Each, however, has been carefully examined, and a report on its nature and value has been promptly sent to the sender. Perhaps, some were disappointed, but we can only report on what we find and not on what we would like to have found.

Instead of a purely technical report, I will ask an indulgence for a few minutes, in order to lay before you some observations that I have made in the nine successive terms that I have served as one of your Consulting Specialists. These are not the observations of a trained practical farmer but rather of a layman, who is deeply interested in the welfare of the farmers of the Commonwealth and in improvement in the methods pursued upon the farms of this and other states.

During these terms, I have experienced much pleasure and hope I have profited through my association with you and the farmers of this and other states. It has been my good fortune to have met many farmers; some of these men had attained success and had retired to private life with a competence. Others were men, who had fairly held their own; still others who were rank failures as farmers. Some of these were men of education and refinement; others were men, who in early life had been deprived of educational advantages but by reading and studying had, through their own efforts, educated themselves. Again, I have met farmers, who neither had nor cared for an education, for they lacked the ambition to succeed in any calling. It has also been my pleasure to have met students and professors from the Agricultural Schools and Colleges, also agriculturists from the cities, who expend annually large sums of money in gratifying their whims and fancies, one of which seems to be possession of a farm. As the farms of many of these men seems to reflect the men themselves, I have naturally seen farms of many kinds, under many conditions and under different systems of management and mismanagement. It will be observed that the experiences have been rather broad.

The same diversity which characterizes the farming class is found in every calling, trade or profession, for in each will be found good, indifferent and poor workers. To this rule, the farmer is not an exception. "Agriculture," said the immortal Washington, "is the most healthful, the most useful and the most noble employment of man." Washington was himself a farmer and delighted more in the superintendence of his farms in Virginia, than he did in following the pursuits of a soldier and statesman. He had experience in all these callings and was, therefore, well qualified to judge. Certainly he was right, for no healthier place can be found than on a farm, where correct sanitation is observed. No occupation could be more useful or nobler than that of providing for the wants of his fellow-man.

Does the average farmer of to-day appreciate the importance of his vocation? Does he place himself and his work on the high plane he should, and does he think for a moment, that upon the farmers of the world depends the very existence of the human race? Have you ever considered what would happen, if every farmer, farm laborer and those having but a smattering knowledge of farming were to suddenly die? Such an occurrence would cause the most terrible calamity imaginable, for the starvation of millions and millions would inevitably follow. Do you feel fully the responsibilities that have been placed upon you, and how utterly helpless the whole world would be without your knowledge and your labors?

Because of these conditions, the farmer is the most needed of all the workers of the world and the profession; profession I say, not trade, for farming in the near future, if not to-day, will have to be carried on by men skilled in science, for there is neither trade nor profession, that involves probably so many problems that can be solved only through the aid of science, as does agriculture. Time was, when the skill and learning which will be necessary in the future were not required, for the soil was virgin nor was competition so keen. In those days, vast expenditures for artificial or commercial fertilizers were unheard of, nor had the Colorado beetle yet invaded this section, San José, the Oyster shell and Scurfy scales were unknown. Spraying fruit trees and potato vines was a thing unknown fifty years ago, because it was, as far as the farmers of that day knew, unnecessary. The pests with which you have to contend to-day had not yet been imported. If they existed here, their presence was not known, and it was not until the destruction wrought by them became so serious, from a financial standpoint, that measures were taken to eradicate or crush them out.

The farmer, in those days, took out most of the elements of fertility, and when the land failed to produce satisfactory crops, he cleared more ground rather than attempt to restore the fertility of the worked out portion. Land in those days was cheap and that could be done but it is not so to-day. I have alluded to the fact, that the farmer of to-morrow to succeed, will have to acquire a greater knowledge of science than the farmer of to-day, and the reason for it is this: He will have far harder conditions to contend with than those of the past.

Now, before going on, let me say to you, that science is looked upon far too lightly by too many. What is science? Knowledge of the truth: "Knowledge of the true, the real, the explained and the comprehended." The real scientist has but the utmost contempt for those who possess little or no knowledge but who pose as learned men and women. That class, who write articles or books upon subjects of which they know nothing and which being read by people in search of learning, so disgusts them, because of their silliness, that they, unfortunately, include, in their condemnation, men, who, after years of training and research, are worthy of recognition.

There is probably no calling, trade or profession that calls for a wider range of knowledge than that of the farmer. I do not mean that he is required to be an expert or a master in each branch of trade but he must or should have some acquaintance with many of them. The work of a farmer involves work along many lines, and while the city dwellers can assign much, if not all of this work to mechanics, the isolated position or remoteness of the farm from the towns and cities, however, makes it often necessary for the farmer to perform the work himself.

We assume now that he understands the work of tilling the soil, which in itself is a trade, but that is but one branch. A farmer must know something of carpentry, so that he can do the odd jobs or erect buildings. Of blacksmithing, he must know enough so as to make repairs quickly, even if only temporary ones. He must know something of the trade of wheelwright or lose much time. Modern farm machinery is coming into such general use and, as many of them are more or less intricate, some knowledge of machinery is very necessary, and the farmer who can dismantle, make repairs to and reassemble his machines, will save not only the money cost but time, and an hour at certain times is worth as much as a day at others on the farm. Thus, it will be seen that some knowledge of the machinist's trade is necessary or at least useful.

Electricity is destined, no doubt, to play an important part on the farm in the near future. I visited one farm in Schuylkill county where much of the work and all the lighting is done by electricity. The presence of various insects and scales requires the farmer to know how to recognize them, so some knowledge of entomology is very useful, if not absolutely necessary. The treatment of the soil of the fields, the preparation of washes for the eradication of pests and the home mixing of fertilizers involves some knowledge of chemistry. To know thoroughly how plants grow, the farmer should have a good, if not wide acquaintance with botany.

If, in connection with his farm, he is running a dairy, he must know how to test milk, otherwise he may be losing money, either because of poor stock or through being defrauded at the creamery. Even with the ordinary amount of livestock, the farmer should have a good working idea of veterinary medicine and surgery, for with this at his command, he may be able to render not only quick but effective service in cases of emergency. Such knowledge is doubly requisite to a stock raiser. It is likewise necessary that he should be able to render "first aid" in case of accident or illness in his family or to his employes. Should he be capable of rendering such service, he might be able to save human as well as animal life, for it might be hours before a physician or surgeon could be gotten.

It matters not how expert a man may be as a farmer, unless he is a business man, he can not make the most out of his farm. Lack of system involves a great loss of time, and unless he can quickly detect leaks and stop them, he will not succeed, and the only way in which this can be accomplished, is through a simple system of bookkeeping. On small farms, it need not be elaborate but it should be sufficiently full and complete to enable him to know whether each branch of the farm has made or lost money during the year. To get the best results of his labors, the farmer must keep in touch with the demands of the markets and the prices prevailing. Having enumerated some of the qualifications that a farmer should have, and I know many who possess them, is there a man among you, who will have the temerity to say, that the modern, scientific, up-to-date progressive American farmer is not the peer of any man. As he is mortal, he has his faults, for no man is perfect. There is a class of farmers, and I have met some of them, that is shiftless, and seemingly without ambition. Their farms are a disgrace, but in every walk of life and in every trade, business or profession, such fellows are to be found.

The introduction and application of labor saving machines and appliances to the work in the fields, to the barns and homes, will largely wipe out the drudgery which has, in the past, too often chararterized farm work in all its branches. With the passing of drudgery, the farmer will have more time for study, recreation and mental improvement. Brain will largely take the place of brawn and the farmer will come into his rights and just deserts of which he has so long been deprived. The motor truck will enable the farmer to reach markets now inaccessible to the horse drawn wagon. The automobile will bring him and his family into closer touch with his neighbors. It will also bring many city people to the country on their outings. The city and country people will get to know each other better and much of the isolation and many of the deprivations you have heretofore experienced will be things of the past. The future of the farmer, to me, seems brighter to-day than ever, if all wasteful methods are wiped out.

In conclusion, let me say to you, your wives, your sons and daughters, "Stay on the farm," for drudgery, through the use of new methods and machines, will be largely abolished and pleasures, that your grandparents never knew, will be yours. In the country is to be found Nature, pure and sweet; there you are closer to your Creator than elsewhere, and in the not far distance future, we expect to see the happiest, healthiest, most contented and prosperous people of the Nation on the American farms.

REPORT OF AGRICULTURAL GEOLOGIST

By W. H. STOUT.

With more time to review some experiences and theories since the Department allows me a vacation without pay and while waiting to be placed on the pension list, I take this opportunity to mention some things that are of interest, at this time, when so many are in the field to uplift the farmer; discharging adjectives, verbs, conjunctions and interjections from the rostrum through the press and magazines.

Associated with many persons during past years, hearing and reading advice to farmers, in many instances it came from those who claim as having been brought up on a farm, but now engaged in other occupations; having left parental homes when they found that actual work was required from them which did not agree with their psychology. Among the fallacies advanced by scientists, that of Jethro Tull, that tillage supplies the place of manure, that crops can be continuously grown without manure from first to last is one instance. Baron Von Liebigo's theory of soil analysis is no longer considered of even theoretical value, yet new emphasis given to both theories by recent authors and lecturers, even by the United States Department of Agriculture. The analysis of plants and actual tests by crops are practical methods to determine what the lacking elements in the soil actually are. The use of raw phosphate rock was advocated which has been found of little value after testing it in various experiments, the material being insoluble, possibly useful to the next generation.

Another theory advocated and tried was cultivating wheat in rows, which was found unprofitable. I saw the experiment at Craighead's, out from Carlisle, and abandoned; as about the period when it was tried the price of wheat was only fifty cents per bushel. During recent years a force of experts—so called—are engaged in soil surveys and soil analysis throughout the country joined by some states making chemical and mechanical tests and describing the agricultural value; all of questionable utility unless finding employment for a lot of students and spending a large sum of money is a consideration.

This State contains within its boundaries what are termed three grand divisions in Geology: Silurian, Devonian and Carboniferous. These are divided and subdivided into numerous formations and as many names. When the soil survey was commenced it was expected to revolutionize agriculture, and, as one interested, paid close attention especially when the adjoining county of Lebanon was reported. Lebanon county is almost entirely in the Silurian system and the agricultural part entirely so; limestone, slate and shale in predomination. The limestone was known as Trenton, Calfariferous and Chazy in various sections, and the extensive valley from New York into Tennessee, an example. When the soil survey began on this formation it was started near Hagerstown, Md., and named Hagerstown loam, stony loam, sandy loam, silt loam, clay loam and clay. Parallel with the limestone, is another formation known as Hudson River and Utica shale, also the Cincinnati group. The same ridge where the famous Lehigh county potato section is and extensive peach orchards near Allentown, Reading, Myerstown, Lebanon and the Cumberland valley are located. This is part of the Silurian system same as the limestone; however it is classed as Devonian, of which there is none within miles until north of the Blue Mountain. When such blunders are made by persons who are supposed scientists, it naturally reflects upon the whole work, so a novice or layman loses confidence in the soil survey.

All the new names introduced in classifying soils are hundreds and any person wishing to familiarize himself with terms should begin early, work late and take a college course. General geology long since classified systems, divisions, subdivisions and formations adopted as state and nation wide definition. The soils of Pennsylvania, described in a State bulletin by Prof. Menges, is of more value to agriculture than that by the U. S. Soil Survey. The word "expert" appears so frequently of late in connection with agricultural teaching, and the word as defined by Webster is "taught by use, experience, familiar knowledge, skillful, practice, dexterous," is misapplied. The average investment in farms amounts to $8000 in land, livestock and buildings; so the farmer's income should be based—as any other business—on cost of production after meeting all necessary expenses and have a fair wage. Until agriculture is so adjusted that farm labor can be paid as much as any other industry, can afford considering the intelligence and experience necessary in modern farming, the problem of keeping the right kind of boys and girls on the farm remains unsolved.

We hear much about intensive farming and greatly increased crop yields as a means to make farming more profitable. It is a well known fact that excessive crops are not profitable as prices are reduced to such a low level that loss instead of profit is the result financially aside from the lessened fertility remaining in the soil. Intensive agriculture is practiced in European and Asiatic countries where much hand labor is employed; where the struggle for existence is acute, labor cheap and the agricultural class little better than serfs. If the American people care to become vegetarians, wear wooden shoes and smocks; sleep on wooden blocks and eat with chop sticks; they can do like the Chinese and Japanese—the type that can live on less than any class of humanity. Differing from other countries where the farms are small, here they are increasing in acreage through the investment in real estate by wealthy people who make fortunes in other industries and in public employ.

Europeans use great quantities of fertilizers, an average much greater than in this country, and have home demand for their products among a dense population—no trouble about cost of distribution. We have depleted our soils to feed Europeans until the virgin fertility has been exhausted and now depend upon the south and west for feeds and for fertilizers anywhere obtainable. If we could produce and sell nothing except butter, lard, milk, eggs, fruit and vegetables the preservation of soil would be easily solved, but other things are needed to support life and maintain health and vigor in these strenuous times when labor is speeded up and urged to the limit. In proportion to the labor engaged with the modern machinery in use this country produces more, man for man, than any other nation.

We now have an army of self-constituted guardians of agriculture, of a class such as compose our officials and some newspaper editors most of whom get their inspiration from observation. Such make our laws, execute them and determine the meaning after years of deliberation. Seeing agriculture from parlor and dining car windows, from touring cars and rusticating at Palm Beach, Miama, Bermuda and Cuba in winter; at Long Branch, Moosehead Lake, White Mountains, Wernersville and Adirondacks in summer, between times at the Waldorf, Bellevue Stratford, Metropolitan or Traymore, in club rooms sipping "lemonade," are the ones so enthusiastic in advising farmers and appropriate vast sums of the people's money to mollify the producers and consumers to gain their good will and votes. Of this class some favor an embargo on farm products, encourage Canadian reciprocity and boycott eggs and butter, talk preparedness and occupy the first row of pews, "wearing the livery of heaven to serve the devil in."

It is not intended that the views herein expressed are antagonistic to real science, as it is an admitted fact that experience, invention and science are of incalculable value in all lines of human endeavor. There is a wide difference between theory and experience. While the two are useful in practice and work well together, experience is of great importance. Within recent years great institutions are endowed to prepare *experts* in agriculture whose experience is limited to class and dining rooms, learning dexterity in handling knives, forks, spoons and hash and finding their way to the pie counter and the till to public funds.

It would appear as if the uplifting movement had about reached the limit. But there is another in process to uplift households on economics by engaging women county agents with fireless cookers, bread pans and ladles to demonstrate how to make mush, egg omelet, roast turkey and how to raise babies, or advocate what, Mrs. Sanger was prohibited from advising in New York.

Three hundred and fifty are thus engaged leaving sixteen hundred vacancies to be filled. And to think in the great Keystone state a single county employed a woman county agent to enlighten the benighted housewives and explain calories, carbo-hydrates, proteins and fats.

It appears that a few autocratic persons are gaining the audience of legislators with a view to control all avenues of agricultural education to gain popularity and the plaudits of a credulous public under the pretense of patriotism and love for the dear people, at the same time petitioning and appealing for appropriations and more appropriations to add to the burden of supporting increasing numbers of economists and uplifters.

Public funds are squandered lavishly upon all sorts of schemes to make room for greedy aspirants for places at the pie counter until it has become necessary to cast about to find new sources of revenue to supply depleted treasuries, national and state; to bond and mortgage the future to meet the extravagancies of this generation. What is left to this country's wealth is contained in the first twenty-four inches of soil, being rapidly exhausted to support the home population and those in foreign countries depending upon the western hemisphere for their daily bread and roast beef.

The latest government report on the value of crops produced in the United States last year amounts to the vast sum of somewhat over nine billion dollars, which, if divided between six million farms, affords each a little above fifteen hundred dollars—about five dollars a day to meet all expenses that are involved in a year's operation. It takes the entire income of nearly seven farms to pay one official or the labor of ten men earning one thousand dollars a year to pay a single commissioner to look up the egg trust, beef trust, coal trust, and trust upon trust. This does not include necessary expenses.

State Senator Charles W. Wicks, Chairman of a Committee appointed to investigate agricultural conditions in New York state reports: "Not more than one-third of the farmers of this state are making any profit at all. One-third are not breaking even. The other third are making about fifteen cents per hour for man labor and nothing for farm women." Much of the blame for the high cost of living is charged to the much abused middle-man, very many of whom are honest and reasonable in their charge and necessary in the distribution of agricultural products as much as are the army of commercial agents daily traveling all over the country. Back to the land is the slogan loudly proclaimed from various quarters and very often those who heed the appeal without experience soon come to grief, and after spending a large sum in *scientific* agriculture and pet theories hang out signs "Farm and Stock for Sale." The abandoned poultry plants, expensive dairy barns, luxurious surroundings and modern conveniences and high ideals rarely produce revenue to meet expenses.

Public expenses go on all the while increasing and frequently unnecessarily as an example the State Legislature recently convened and adjourned for a period during which the expenses continue at the rate of seven hundred dollars a day; forty-nine hundred dollars a week and twenty thousand a month. No doubt some of the committees are busy planning how to promote party politics; how to formulate bills; how to exchange votes to get appropriations for more appointments on commissions, advisors, agents and instructors for favorites at the same time blame the other party for extravagance.

One of the commendable things proposed is the repeal of antiquated, useless laws on the statute books, and it may so happen that the one approved May 8, 1876 creating the State Board of Agriculture may be clandestirely among them. Be on guard!

After many years association with this public spirited, useful and unselfish organization as a member and specialist without perhaps adding to its dignity or usefulness, it is at least a flattering recognition of having done a little to alleviate distress among the poor people.

If the Department carries out the proposed movement to distribute tad poles throughout the State, to produce cheaper meat by supplying an abundance of "bullfrog legs," future generations will respect and honor your humble associate from Schuylkill county as an early advocate of this measure to stock the waters of the State with "Rena Pipiana," so that when workers open their full dinner-pails to find the hind quarters of prepared bullfrogs on toast buttered with oleomargarine they will bless the Department and your humble servant.

An embargo should be placed on bullfrogs. Having served a just and lawful time in assisting to uplift humanity and outlived this progressive age it may be well for the benefit of the coming generation to find a substitute more capable to continue the good work through the State Board of Agriculture.

THE FARMER'S BURDEN

"Rural uplifters, Commissions, Investigators, Surveyers, Demonstrators, Inspectors, Theorists, Politicians, Promoters, Farmomanics, Agents, Advisers, Economists, Office seekers, Combinations, Trusts, Pseudo scientists, Faddists, Experts, All-around Cranks, Instructors, Kid Glove Agriculturists, Agitators, Tax Consumers, Professors, 12, 10-8-6-4 M dollar Officials, Thistles, Thorns, increasing Taxes, Bugs and beetles, worms and fleas, flies and germs, Bacteria and Moths, Rots and Molds, Blight and Scale, Lice and Mites; Floods and droughts, wind and hail, frosts and fires, hawks and owls, weasles and minks, snakes and lizards, rats and mice, inflictions upon agriculture, besides the high price for coal, lumber, gas, hardware, labor, coffee, sugar, potash, nitrate, rubber, leather, diamonds and pearls, steel and iron, bathtubs and soap, everything 100 to 800% more costly while farm products are 50% advanced except hay."

ADDRESS

By MRS. JEAN KANE FOULK.

I came before this Board three years ago and outlined very briefly what I hoped to develop and make out of my office of Farm Adviser. The office was a new one, not only in title, but in object, for it was the first time that any such work had been undertaken by the State Department of Agriculture, and the first time that rural women's interests and needs in the home and farm life had been given a definite standing or been recognized as so essential a part of the agricultural life of the Commonwealth as to demand a special representative of their demands and needs. To be sure we had had women institute lecturers; I think seven was the greatest number at any one time, and there were seasons when only one was regularly scheduled in the institute bulletin. Therefore, the appointment of a Farm Adviser of Homes was a marked advance and change—even if it did not only mean one woman to help solve the many and complex problems of the rural homes, in the state having the largest rural population in the Union.

I am asked to come before you to-day in order that I might again enlist your interest and sympathy in this work. I want to give you a brief outline of the work done and how it has been done, and I want to suggest to you how it should be continued and developed and the need that it *should* be continued and developed.

Within the last year I have travelled over 23,000 miles. I have never made a visit or delivered an address that has not been asked for, nor, on the other hand, have I ever refused to go, but have always been ready for service. I have written over 2,000 letters, most of these in longhand, because I had no money to pay for a stenographer. I have paid special visits to, or, had interviews with over 300 individuals, and have made over 165 addresses where all the local expense was covered by the people to whom I went to speak, and where the audiences ranged from a handful of interested women to mixed audiences of several hundred persons. I have written many articles for publication. I have been called upon to design improvements in homes in connection with these visits and lectures, and have started, or helped to start, community centres, home-school associations, girls' clubs and mothers' clubs in many counties of the State. When travelling in rural localities I make a practice to visit rural schools and speak to the children and teachers. I have been instrumental in the installment of a number of septic tank sewage systems. In one township in Erie county there are four rural schools which now have this improved system.

This list of activities does not cover the interviews I have had with women who are working in various ways that stand for extension work, who wanted advice and sympathy and help of various kinds that I could give them from my experience. Nor does it cover such items as advice given to women on farms who own the farms and are trying to manage them themselves. It would be impossible to tell the details that all this work has covered, for there is hardly an item of interest connected with the rural woman's life that I have not come in contact with. To simplify and extend our influence we should have bulletins and leaflets and printed information in various forms that could be sent over the state to answer inquiries, so as to relieve the pressure of so much writing and the expense of travel that personal interviews entail. A stenographer could easily be kept busy by this branch of the Department. To get data and put it together for bulletins and leaflets takes a great deal of time. One person cannot make addresses on so many diverse interests, or understand and answer the hundreds of questions that come to one, without time for study and thought. Many times the work has been curtailed, because of the lack of funds, and I have not been allowed to work continuously, but have been laid off for weeks at a time, because the money for my expenses and salary was not forthcoming. The demand for other farm advisers has been very great, I know, but when it comes to a question of cattle, soil and poultry vs. the home, the fact that the legislature appointed eight men and one woman on this Board, will show how the appropriation has been divided. The women of the State, the Federated Club Women, the Rural Women, the Grangers, the Suffragists, and even the Antis, all feel that we need and should have more done for our homes, and that this appointment of a farm adviser should be but the entering wedge for more and better things. Three years ago, when I was not only the baby member of this Board, but, as I am to-day the only woman member of it, I made a plea for your support and asked you for help. I asked them in general terms —now, I am asking for a definite thing. I want money appropriated for this special branch of the work, that more people may be employed and what is done, may be better done and in a more organized way. The work shows there is a demand for it not only in farm homes, but in homes everywhere, urban and rural. Then, won't you, one and all, use your influence to help bring this matter properly before the legislature so that the interests of our rural women and children—yes, and of the men as well—may not be neglected, but that their interests may be substantially advanced and their living conditions improved during years that are to come?

REPORT OF COMMITTEE ON LIVESTOCK

By DORIS L. FULKMAN, *Chairman*.

Livestock farming of our State has not advanced so rapidly as some other lines of farming. Compare our way of harvesting half a century ago and now and you can quickly see the difference. You may ask me why it has not. Here is an example of what is going on on too many of our Pennsylvania farms. A Mercer county farmer had a Holstein Jersey heifer which he bred to a Guernsey bull because he thought it would make a good conglomeration. We have too many farmers who don't care what to drink so they take the whole blamed business. A man in the livestock business should have a goal, the goal should be a Percheron, a Belgian, a Holstein, a Guernsey, a Jersey, a Berkshire, a Chester White, a Merino, a Southdown, or some particular breed of livestock in which he is interested. If you were going out to buy a good draft horse you would go where they had been raising the breed of your liking for years the same of any other livestock.

The question then arises of community breeding. Does it pay for a community to raise the same breed of livestock of the different kinds? Yes. It is community breeding that makes Waukesha advertise as the Guernsey capitol of America and Jefferson county, Wisconsin as the Holstein and Guernsey hub of the world. Take any county of our State and find a community where a certain breed of livestock has been raised for a generation and you will find better homes, better schools, better roads, better crops growing on the land and a higher ideal of morals than where they have no particular aim in raising livestock.

I know of one community that keep Jersey cows and patronize a community creamery that is known for miles around on account of its prosperity, when hay and grain dealers want to buy a few cars of hay or wheat that community is gone to first because they can supply their wants at less expense. Attend their church and you will find a people who look prosperous and happy, pay their preacher before the annual meeting and give over $1,000 per annum to missions. Go into their community on certain Tuesday evenings they will take you to their large buff brick Grange Hall, show you every nook and corner of it and finish by telling you it is paid for. A certain farmer in this community went down to Kentucky to a Jersey sale and paid $1,000 for a bull. Now every farmer cannot do this but every community can. The best sires are not too good for any community provided they appreciate their value.

All good livestock is by no means pure bred; but that is no argument why we should keep grades. If a man is successful with grade livestock that is the best sign possible that he can make a success of the pure bred livestock business. In starting into the pure bred livestock business it is not advisable to sell all your grades at once and replace them with pure breds but buy a sire and one or two females of the desired breed and stick to your breed. A great many failures have been made by changing breeds too often. A jumping jack is a good thing to amuse people with but they usually die in the act.

A Lawrence county farmer at a pure bred Percheron sale in October, 1914, bought an imported mare for $400. The next spring she dropped a horse colt for which he was offered $100 when it was six months old but would not accept. Was not this a good investment when the mare made a half team and dropped a mare colt in the spring of 1916? The grand champion steer at the International Stock Show at Chicago was not a pure bred but was a pure bred Hereford Shorthorn cross which may bring results for one cross but after that you go down instead of up the ladder.

Now, before leaving the subject of pure bred livestock, I will say that we should not buy it for the papers alone, but should buy animals that have the qualities desired. Livestock farming is the only branch of farming that will not only support itself but will leave the land in a better state of fertility than it was before. In 1916 the seven leading Western markets received 9,320,050 cattle which is 1,536,468 more than they got in 1915 and 2,146,810 more than in 1914. These figures do not indicate what the nation's herd of cattle has grown during the past two years. No doubt there has been some increase on farms and ranches but they are marketed lighter than heretofore. During the past year the seven markets have received 25,343,895 hogs against 21,631,482 in 1915 and 18,261,541 in 1914. The marketing of sheep and lambs has been slightly in excess of 1915. In 1916—11,637,108 reached the market which was 476,879 more than in 1915 but 1,634,344 less than in 1914.

In spite of the light weight of cattle and hogs there has been an increase in the supply of meats, the prices of meats are the highest known, partly on account of our export trade, another the biggest home consumption in time of high cost.

A number of Lawrence county farmers make sausage and sell it to the grocers of New Castle at 18 cents per pound. Last week they raised it to 20 cents and there was very little opposition. Last year they sold it at 15 cents and had they made a raise of two cents the grocers would not have bought it because their patrons would not have stood the raise, but this year money is plentiful and pork somewhat scarce so they buy. The farmer talks about not getting enough for his products. Was there ever a time before when he could get from 13 to 18 cents for dressed pork or $2.50 for a bushel of potatoes. Farm products are high and the time to make hay is while the sun is shining for it is not going to always shine so brightly as it is now shining.

I have mentioned a few of the animals that we want to keep on the farm but there are two others that will have to be kept if we are to exist and be a prosperous nation, the boy and the girl. Give the girl a chance to do something besides washing dishes and such jobs which they seldom like, let them help with the cooking and baking for there is as much art in baking a loaf of bread that is fit to eat as there is in playing ragtime music and powdering and painting. Give the boy an interest in some of the stock or crops and when it is sold let him have his share of what they bring. Teach him to think along farm lines, teach him that farming is just as honorable as any other vocation so that when he is old he will not depart from it.

In conclusion, I wish to repeat the Country Boys Creed, by Edwin Osgood Grover.

"I believe that the country which God made is more beautiful than the city which man made, that life out of doors and in touch with the earth is the natural life of man. I believe that work is work wherever we find it but that work with nature is more inspiring than work with the most intricate machinery.

"I believe that the dignity of labor depends not on what you do, but upon how you do it, that opportunity comes to the boy on the farm as often as to the boy in the city, that life is larger and freer and happier on the farm than in town; that my success depends not upon my location but upon myself, not upon my dreams but upon what I actually do; not upon luck, but upon pluck.

"I believe in working when I work and playing when I play and in giving and demanding a square deal in every act of life."

REPORT OF THE APIARIST

By H. C. KLINGER.

It becomes my duty to prepare and submit the following as my Eighth Annual Report as Apiarist to the State Board of Agriculture. There is nothing new or startling to report for the year just past, in the line of Apiculture. Reports coming in during the earlier part of the season indicated a large crop of honey; but drought setting in throughout different parts of the country greatly reduced expected production. According to verified reports, the yield of honey is shown to be 28% greater in 1916 than in 1915. That for Pennsylvania is 54 pounds surplus per colony or 37% greater this year than the preceding year. All the states have shown an increase in production over that of 1915 with the exception of four of the Atlantic states, North Dakota and seven of the extreme Western states.

In the matter of honey consumption, over 67% of it is used locally and does not find its way to outside markets. The demand for honey is rapidly increasing and better prices are being obtained. There are several factors responsible for this: The increased cost of all food products; a system of extensive advertising; the shipment to the countries at war of the cheaper grades of honey to take the place of sugar, and lastly, honey is being recognized as a food, not a luxury —a food that helps to make up a balanced ration for the human body. The nations at war have discovered that honey has a greater food value in units of energy than many of the other staple articles of food.

Dr. Hirshberg, of John Hopkins University, says, "Honey has weight for weight, and bulk for bulk, more nourishment, more fuel and more heat units than meat, fish or eggs. One ounce of honey surpasses an egg by 75 units. Moreover it is decidedly cheaper and twice as helpful to human energy."

A table of comparisons was recently compiled by the Iowa Food and Dairy Department showing the following:

Honey at 20c a pound, or 7 oz. at 8¾c equals

5.6 oz. cream cheese worth,	10½c
10 eggs,	10c
12 oz. beefsteak,	18c
15 oz. codfish,	20c
8 oranges,	24c
5 bananas,	10c
8 walnuts,	13c

The slogan today in bee-keeping is "Eat Honey." It is not a luxury, it is a valuable article of food and cheaper in comparison than many of the commonly used food products.

The business of honey production is rapidly assuming its place among the agricultural activities of the State. There are perhaps no greater number of bee-keepers than formerly, but they are becoming more wide-awake. This is due to the fact that the scourge of bee diseases which is sweeping over the State is putting bee-keepers on their mettle and is also to some extent eliminating the careless, slipshod box-hive bee-keeper whose method of bee-keeping has been a nuisance to his more progressive neighbors.

The status of the bee-keeping industry a dozen years ago was different from what it is today. Then no agricultural school had given the slightest recognition to apiculture. Today Agricultural Colleges in ten states offer courses in bee-keeping. Then the National Government did very little for the Apiarist and his industry.

Congress has now appropriated $25,000 for Apiculture—$5,000 of which is to be used for inaugurating extension and demonstrative work. Government experts are now working in three different states, encouraging and teaching modern methods and appliances. Many of the states have inspection laws. Others are repealing inadequate laws and passing better ones. Greater efficiency is demanded of the inspection force and the entire work of inspection is being put on a firmer basis. Some of the states where several years ago foul brood diseases were rampant and bee-keeping became almost impossible, now report the diseases under control and the industry vastly improved, and the production of honey largely increased.

Localities in our own State, where inspection work was carried on, report an absolute cleaning up of the diseases. Under former conditions it was impossible to secure any honey, now large crops are again obtained showing large returns for the small expense incurred by inspection work. Campaigns of education are being conducted in different ways teaching the public the value of honey as a food and also the value of the bee to the fruit grower as a pollenizer of fruit bloom. Thousands of families who never thought of honey are now substituting it for sugar, realizing it to be more healthful and less expensive. This has caused the demand for honey to exceed the production out of all proportions insomuch that in many places the market for extracted honey was all cleaned up before the holidays. In speaking with the proprietor of one of the large honey farms of Sioux City, Iowa, recently, the subject of conversation turned on the possible overproduction of honey. His reply was that while they were using tons of the article their only trouble was in meeting the increasing demand for it.

Some one threw up his hands in dismay and said to one of our State inspectors, "What are we going to do with all the honey when all these farmer bee-keepers are educated to modern methods of bee-keeping?" It is safely estimated that only one per cent of the population of the country now eat honey, and if all the honey now produced were passed around it would barely give each individual a taste of it.

The Pomologist may perhaps safely caution farmers to go slow in planting commercial orchards for fear of overproduction, even when choice apples now bring 60 cents a dozen. The Apiarist on the other hand believes that every farmer having an orchard should set a few hives of bees in it by doing which he would not only secure finer fruit but also get a good share of Nature's sweet without causing a slump in the honey market.

ECONOMY--EFFICIENCY—PREPAREDNESS

We have thus far avoided the use of these words because their frequent use has made them threadbare. But lest some one might criticise this report on account of their absence, we have placed them all together to percolate through the remainder of the report as your thoughts may suggest.

Comparing the present state of the bee-keeping industry with its future possibilities, it seems yet to be in its infancy. Pennsylvania has a variety of honey bearing flora unexcelled by that of any other State. Early in the spring as soon as the weather is warm enough for bees to fly until the heavy frosts of autumn come there are flowers of some kind blooming that secrete honey. The soft maples and willows open early in spring and their honey stimulates early brood rearing. This is soon followed by the various fruit blooms which frequently give a start in the surplus department. This is shortly followed by the locust which for a short time yields profusely. After this comes white and alsike clover. The blossoming period of the former extends through a period of several weeks. The heaviest flow of white clover is in the month of June; but quite frequently it tides over until the buckwheat season comes. In some sections where the timber has not been taken off too closely, basswood and poplar give large yields. Sumac during the early part of July never fails to give a crop and the honey is of a fairly good flavor. Next comes buckwheat which begins in the middle of July and lasts until late in the season. This in many parts of the State is the main crop. Lastly comes goldenrod and the asters which continue to yield even after the first frosts. In this large list of flowers there has not been known a year when they all failed. Many states depend upon a single flower for a crop and if this fails in producing their entire crop is gone.

It is estimated that there are nearly 40,000 bee-keepers in the State, with an investment of over $2,000,000 and an annual product of over $1,500,000. It might appear from these figures that it would not be safe to encourage any further investment, yet from practical observation it is known there are miles and miles of territory that do not have a single colony of bees, and that have an abundance of flowers that produce honey. It is estimated by one of our inspectors that ten colonies of bees could be kept where one is kept now without overcrowding. It has been demonstrated that within the radius of a few miles a ton or more of honey can be gathered and from this fact it must be evident that tons upon tons of honey are going to waste every year. Where is the economy in all this?

Every up-to-date bee-keeper knows that by the proper attention and management of his bees each colony can be made to store double and sometimes more than double the amount they often do. Also by the sowing of leguminous plants such as the alsike, crimson and sweet clovers and vetches any territory can be made to support more bees aside from increasing soil fertility so much needed. This is efficiency.

And here is the end—the part usually containing the sting. The Apiculturist is not without his troubles. The diseases of American and European Foul Brood are making a disastrous sweep over the entire State. It has wiped out whole apiaries in different parts of the State. It is as contagious to the bees as smallpox is in the human family. A single bee carrying honey from a diseased colony may in a short time infect a whole apiary and cause the loss of every colony besides spreading the disease to neighboring yards.

Excellent results have been obtained by the work of inspection done in the past few years since we have an inspection law. Thousands of colonies have been inspected and whole communities helped and cleaned up. The work is a credit to our State, and to those who did it, but inadequate funds do not permit the keeping of a sufficient force of inspectors or a system of fighting by which the diseases can be stamped out. It is similar to fighting fire; unless there is a force sufficiently strong enough to hold it in bounds it will compel a retrenching on ground already covered. It will require a vigorous system of work by which it can be driven from township to township and from county to county and the ground once covered made immune to recurrent attacks.

This work will depend entirely upon legislative action. If the means are adequate there is no reason why this State should not be made the first in the value of honey products. With a campaign of education and a thorough system of inspection work this industry can be made one in which our State may well be proud.

REPORT OF COMMITTEE ON POULTRY

By W. THEO. WITTMAN, *Chairman.*

As Chairman of your Committee on Poultry, I would respectfully report that several matters noted in the report of a year ago are still trending in that direction, and have even been accentuated. For instance, both eggs and poultry have been higher in price and are likely to go still higher. Pennsylvania farmers have reached 48c to 56c a dozen. Pennsylvania egg farmers, 72c to 87c a dozen and have, besides, been honored this year by New York Produce with top quotation under this phrase, "Pennsylvania and near-by white eggs fine to fancy." The premium paid on choice eggs by this same market this year has been higher than ever. For instance, the quotations November 19, 1916, were "Fresh gathered, extra fine at 47 and 48c." "First, 44 and 46c." "Fine to fancy brown 50 to 57c; white eggs 65 to 72c."

These quotations show and I would especially call the attention of this Board to these figures, that best white shelled eggs on this date were bringing the producer 24c a dozen more than best farm eggs and 28c a dozen more than the run of average farm eggs. Also, that white shelled eggs at the same time were bringing 15c a dozen more than selected, fancy brown shelled eggs. Surely with such inducements it is up to our farmers to produce what the market wants and is going to pay for.

This last year, too, eggs started to be higher in price earlier than ever before. Our egg farmers were getting already in August eight cents a dozen more than in August a year ago; were already getting 50c a dozen and better this year in September. Contrary to the experience in other farm crops the poultry farmer as a poultry farmer has had no cause to complain of the prices he has been getting; or the returns made to him for his eggs by the commission men. The just farmer on the other hand has usually not got what is coming to him. He got the price of the poorest ungraded eggs reaching the market or, the price a huckster or collector saw fit to allow him. He especially fell short if his weekly basket of eggs was made up entirely or in part of choice white shelled eggs or even good brown shelled eggs. Such eggs are all graded out— or perhaps graded up would be a better way of putting it—and finally make someone a big profit. The remedy is obvious: keep hens only that will lay white shelled or good brown shelled eggs and consign these eggs to some reliable New York City commission man.

When it comes to the returns for live and dressed poultry these too have seen a big jump, in some cases 50%. Or, farmers who in August, 1915, were getting 12c a pound for old hens got 18c a pound in August this year. Broilers and squab broilers also brought an especial good price this year. Some growers reported receiving up to 90c a pound. Turkeys brought the producer more and cost the consumer more than ever before. The former received something like 28c a pound live weight and 35c a pound dressed, and the latter paid something like 35c a pound live weight and 50c a pound dressed.

Because turkeys have practically disappeared from Pennsylvania as a dependable market crop and because the great bulk of turkeys sold in this year's holiday markets were shipped in, there was a very wide range of prices this year. In one city the day before Christmas there was a glut and turkeys could be had for 28c a pound and not a hundred miles away in another city there was a scarcity and the price jumped to 50c a pound.

The "egg boycott" by city women and so much featured by the big city dailies was an exceedingly unfair and uncalled for movement and was justly, bitterly resented by everyone who had eggs to sell last month. This and the still continued hammering at cold storage eggs and cold storage of eggs can result in only one thing, viz: This same city boycotter is going to pay more than ever next year for eggs. This whether the war ends or not for the blunt truth is, the production of poultry and eggs is not keeping up with the consumption. The city and village backlot poultry grower has quit by the thousands being too busy with both work and play and claiming grain is too high; the farmer is not increasing the size of his flocks and although yearly we have more and more big utility poultry farms these are not filling the ever widening gap as indicated above. Therefore, the prospects of the exclusive poultry farmer that is in or the one thinking of going in are brighter today than ever.

REPORT ON SOILS AND CROPS

By PROF. FRANKLIN MENGES.

In the soil investigations throughout the State during the past year many conditions were discovered which are not so easily explained, for instance, in the Red Shale soils of the southeastern part of the State frequently the surface soil is quite sour while the subsoil is neutral or slightly sweet. The soils and subsoils derived from the Micaceous strata throughout this same area, after years of croping without liming are still sweet or at least neutral.

The surface soils derived from the Bloomsburg Red Shale in Columbia, Montour and Union counties, if at all sour, are only slightly so while the subsoils are invariably sweet or neutral. The soils and subsoils in Montour and Union counties derived from the Helderberg limestone and its accompanying strata are invariably sweet, while those derived from the Marcellus are just as invariably sour and usually extremely so. The soils and subsoils derived from the Mauch Chunk Red Shale in the Conyngham Valley, Luzerne county, are usually neutral or sweet except those of the valleys in which the limy minerals of these strata have been dissolved out, which here causes a slight sourness.

The one plausible explanation that can be offered for the existence of a sour surface and a sweet subsoil in the Red Shale soils of the southeastern area, is that during the heavy liming period as high as 100-300 bushels of lime were applied on these soils at a time and that by this time this lime has worked down into the subsoil and is keeping this soil sweet all of which is manifested by the fact that red clover will remain two seasons in these soils and yield a splendid crop of clover hay the second year while in the soils which have not been so limed the clover will remain only one year and then make only an indifferent yield. The Micaceous soils of the southeastern area contain a larger number and quantity of basic elements than any soils of any other formation in the State and these elements neutralize acidity as well as lime and sweetness in these soils is not a definite indication that lime is not needed in fact lime applied on these soils, except the shaly hydro micas, has produced splendid results, not because it sweetened the soil but because it supplied this element or liberated elements which the plants needed. The sweetness or neutrality of the soils derived from the limy strata of the Hudson River, the Clinton Red and the Bloomsburg Red Shale, the Helderberg limestone and its accompanying strata and the Mauch Chunk in the Conyngham Valley, when well cultivated, are neutral because the lime contained in these strata is made available or is acted on by the gases brought into it from the air by cultivation, and those formed in the soil by the action of bacteria in decomposing organic matter. But what is still more phenominal is that the soils derived from the strata previously enumerated will produce luxuriant crops of clover when they are definitely sour, as was demonstrated during the last season by an investigation in Fulton county where in a field with soils derived from the Helderberg limestone and its accompanying strata, Red and alsike clovers and alfalfa were growing thirty-six inches high in a soil definitely sour while the soil of the same origin on an adjoining cultivated field was neutral, similarly on a field in Somerset county with soils derived from the limy strata close to the Pittsburgh coal vein, which were sour, produced a yield of wheat, a lime-loving plant of 45 bushels to the acre of a hard red high milling quality, a rather unorthodox agricultural thing for a field to do.

The production of two to three tons of clover hay which it is frequently said will not grow on sour soils and 45 bushels of wheat, a lime-loving plant all produced on sour soils, are some of the problems which confront the soil examiner and which he is expected to unravel for the farmer and which it is his duty to unravel. Both the soils which produced the large yields of clover hay and wheat contained some lime and large quantities of organic matter, which in the clover field was derived from applying rich manure and from previous crops plowed under, while that of the wheat field was derived from plowing down a heavy clover and timothy sod amounting to fully three tons of dry matter per acre. Through the intensive cultivation of these soils previous to seeding both these crops, air was introduced into them and healthy processes of decomposition started. After decay had proceeded far enough the ammonifying bacteria took up the process of changing the nitrogen contained in the organic matter into ammonia when this had been attained and in the presence of the ammonia a congenial soil environment produced for the nitrifying bacteria to change the nitrogen into nitrous acid; this operation began and in this way, enough available nitrogen, together with that furnished through the agency of the vigorous nitrogen gathering bacteria found in the nodular excrescence on the roots of these clovers was provided. Not only was a sufficient amount of nitrogen provided through both agencies previously referred to but the nitrous acid produced in the presence of the limy minerals of these soils combined with the lime and produced the *nitrite* of lime which was readily oxidized and converted into the nitrate of lime, a salt in which both the lime and the nitrogen are in a most available condition and one which both the clover, the timothy and the wheat plant love.

Nitrous acid makes other mineral fertility available especially phosphoric acid. From this it is evident that in order to maintain the productive capacity of the soils it is absolutely essential that whenever a growing crop is in the ground the manufacturing of nitrous acid should be started in such a way that it can continue throughout the entire growing season of the plant, so as to obtain maximum yields. The nitrogen in the soils is well nigh entirely contained in organic compounds and these are usually in such a combination that plants cannot obtain the nitrogen and therefore it is necessary that the making available of nitrogen should be maintained and in order to maintain it, there should be at all times more plant residue or organic matter in the soil to furnish the cereal crops with all the nitrogen needed by a maximum yield as well as make available all the lime phosphoric acid and potash these maximum crops may need. That such a condition accidently prevailed in the soils which produced the large yields of clover hay and wheat we do not hesitate to assert and that lime either occurring naturally in the soil or that which had been previously applied and the phosphoric acid and the organic matter were the fertility factors in the production of these crops. With these elements present in these soils and the conditions as previously stated existing, the soil becomes a fertilizer factory with a solvent not harmful but in which all the elements are factors in plant production. This work has been started in connection with the farm demonstration work of the Department of Agriculture by so arranging rotations that a soil improving crop can be raised with every soil exhausting crop so as to have a sufficient quantity of a high type of organic matter present at all times in the soil to keep bacterial life active as well as provide it with the food upon which it thrives and furnishes the plant with the necessary fertility.

A practical experimental demonstration to thoroughly prove and work out the farm without in any way interfering with the regular farm crops has been started at New Kingstown, Cumberland county and near Goldsboro, York county. Sweet clover was sowed with wheat, which had been sowed in corn stubble, about the middle of April 1916. A splendid stand of sweet clover was secured which by the 20th of August was a growth of 7 tons of green material per acre or 14,000 pounds. If we estimate the green crop to contain 75% water we have 3,500 pounds dry matter which according to the best authority contains 70 pounds of nitrogen. The 70 pounds of nitrogen when oxidized to nitrous acid will make 235 pounds nitrous acid which if it is being produced in contact with limestone the acid will have the power to make available more than 120 pounds of lime per acre while a corn crop yielding 100 bushels of shelled corn and 3 tons of corn stover and a half ton of cob requires only 22 pounds of lime or there is being made available about 5 times as much lime as is needed. If the nitrous acid would be produced in close proximity with the finely ground undesolved 30% phosphate rock in manure applied to soils containing lime and the bacterial life previously referred to, it would be possible at the lowest estimate for this acid to make available 62 pounds of phosphorus and 120 pounds of lime while a corn crop yielding 100 bushels shelled corn and 3 tons of stover and ½ tons of cobs per acre requires 23 pounds phosphorus and 22 pounds lime. A wheat crop yielding 50 bushels of grain and 2½ tons of straw per acre requires 16 pounds phosphorus and 11 pounds lime, while 3 tons of timothy hay per acre require 9 pounds phosphorus and 20 pounds lime. These demonstrations should be made in soils deficient in lime, that what has been said can be done in limy soils is no longer questionable, but whether it will work out as well in the Chemung soils, the Catskill, Poconos and in the Barren Shales and sandstones of the coal measures has not been demonstrated, but that it should be is only fair to farmers who have farms where these soils occur so as to make not only the limy soil fertilizer factories but all agricultural soils of the State.

PENNSYLVANIA FORESTRY

By I. C. WILLIAMS, *Deputy Commissioner of Forestry.*

Forestry in Pennsylvania during the last year, in fact, the last two years, has been marked by development and management rather than by great increase in forest area. The Pennsylvania State Forests at present equal 1,012,000 acres. Only 8,000 acres were added by purchase during 1916. In development, very considerable progress has been made. To date there have been built 282 miles of new roads and 1,462 miles of old roads were repaired. There are 930 miles of fire lanes opened through the State Forest, while the total length of trails is 670 miles. The surveyed boundary lines amount to 2,217 miles, while of telephone lines there are 266 miles of metallic circuit and 36 miles of ground circuit. One hundred connected telephones are in service for forest furpose. For the purpose of forest protection, there are erected 34 towers of wood, 6 of steel, and 77 tree towers, a total of 117.

The new forest protection code is giving satisfactory results: But there are still too many fires in Pennsylvania. Happily, most of them latterly have been small. Probably the State will never be able to prevent forest fires entirely. The character of our population and the diversified industries of the State, together with the numerous lines of railroad and tramways upon which coal-burning engines run to and fro, furnish conditions almost ideal for the starting of fires. The endeavor of the Department is to prevent them as far as possible and to confine them to the smallest area. Even in the great cities and towns fires occur. Here are valuable fire apparatus and trained men constantly on guard ready to respond at a minute's notice. With the most highly developed prevention and extinction systems, fires still destroy property. How much easier, therefore, it is for fires to start in the great open woodland where conditions for burning are ideal. Because of the great expanse, a fire started maliciously or accidentally may be unnoticed for a considerable time. Extinction then becomes difficult, while prevention, as an absolute fact, will probably never be realized. The one thing to do is to detect the fire in its early stage and confine it to the smallest possible area.

The foresters and their assistants have discovered, marked, and made accessible 2,250 springs, and of this number they have cleaned and walled 1,300. For the purpose of delimiting the forest areas and giving them over to intensive management, compartments are laid out. These are frequently bounded by fire lanes, so that compartment line and fire lane become one and the same. Of compartment lines proper there have been opened for use 190 miles.

To assist the Department of Fisheries in stocking streams and keeping them stocked, the Department of Forestry has planted 890,000 fish. To help the Game Commission in its work, the Department has consented to the erection of 11 game preserves within the State Forests; and in accord with the law of 1915, devotes the reasonable services of its employes to furthering the work of both these other branches of the government.

For guiding visitors into the forest and over the roads, it has erected 3,500 sign boards. For the purpose of restoring forest cover to our hills and mountains, improving water supply, preventing erosion, and producing a future timber crop, it has planted to date 22,250,000 trees, representing an area of 12,000 acres.

In the southeastern part of the State the disease known as the chestnut blight has ravaged our wild chestnuts and it is feared has killed practically the entire stand. If the trees are not yet dead, most of them are infested and likely to die. In the State Forests the trees affected are being utilized before they become valueless. Thirty-eight foresters report the disease as spreading; 4 of them report it as about stationary, while 7 report no diseased chestnuts in their region.

In order that the forest may be most useful for the purpose intended, it must be managed and improved. It must not be permitted to become too dense nor must it be allowed to go to the other extreme. Where over-density of growth is found, improvement cutting must be made. These have now been made in number 235, and the total cash returns from such cuttings have amounted to $65,000. Other returns from the State Forests to date are $66,500, making a total of $131,500 paid into the State Treasury.

The forest nurseries in which the Department grows seedling trees for planting, cover 14 acres of bed area, while the nurseries themselves occupy much more ground. Upwards of 20,000,000 young seedling trees are at present within State nurseries, and about half of these will be available for planting in the spring of 1917. Since the Department will be unable to plant all these because of inability to stretch the planting fund, there will be a considerable number to give away to individuals who may desire to plant new woodlots or strengthen old ones. Trees may be had for the asking.

The Pennsylvania State Forests now are and in the future will continue to be the camping and recreation grounds for our people. The total number of leased camp sites is 300, and the number of camps of all kinds last year in the forest was 1,000. Permanent camps are leased to citizens of Pennsylvania who may use them with a large degree of freedom for a small rental. Persons wishing to use the State Forests for picnic purposes or as ordinary recreation grounds, have this privilege without permit and without fee. For camping and hunting purposes, the government of Wurtemberg in Germany collects more than a half million dollars every year in the form of licenses, but the State Forests of Pennsylvania are free. The Department encourages this use and trusts that the people will avail themselves more largely of this privilege. All that is asked in return is that they obey the law and do not injure the woods.

In order that Pennsylvania may be able to do the big things in forest restoration and protection which a State of her size and wealth should do, having at least eight million acres of land suitable for nothing else but the growing of trees, the Department should be permitted to acquire within a reasonably short time at least five million acres of land to be held, developed, and managed as great State Forests. New York, by a referendum vote of the people, has just approved a new expenditure of ten millions of dollars for the purchase of additional State Forests.

A problem before the Pennsylvania farmer is better use of his least valuable land. This is usually rough or otherwise agriculturally undesirable, but still it may be made to produce a crop. No farm acre should lie idle. All land may be made to respond with that product which it is most capable of sustaining. In the case of the non-agricultural and rough farm land, a portion of it may be maintained in farm woodlot. Experience has proved that 10% of the farm area is profitably maintained in tree cover, used for woodlot purposes. Still other land thinly set with trees or without forest cover, but agriculturally unprofitable, may well be devoted to special tree crops, and among these are the nut-bearing trees. Before the advent of the chestnut bark disease we would have said chestnut. Now it is well to recommend the vigorous fruiting oaks, certain of the hickories, the black walnut, and the Persian walnut. The American people have neglected the tree nut crops. The black walnut of today is no better than it was 100 years ago. Development of tree nut crops by better breeding is in its very infancy. The belief that the Persian walnut succeeds only in mild climates deterred its planting in this country, and, when grown from seedlings, is much too long in maturity. Grafting, budding, and hybridization are now employed with all nut-bearing trees, and the results seem to be of great promise. Ordinary mast will furnish food for swine; the improved nuts, food for the farmer and his family, and afford a considerable source of income. The culture of almonds in this country is practically unheard of, and yet there is an abundance of wild almond stock which, under cultivation and intensive methods, might well be made produce something of value.

Two problems relating to practical forestry present themselves to the people of Pennsylvania. One is the problem of floods, the other of plant and tree diseases. Yesterday the Monongahela was above the danger point. The streams of the State are at full flow. Further precipitation or 36 hours of weather above the freezing point would greatly augment the runoff. This state of affairs has been going on for years. Latterly we have waked up to the thought that something must be done about it. What is the remedy? Much of Pennsylvania's water supply passes to the ocean without having been utilized. Could it be made to enter the soil and deep strata of the earth, it would reappear as springs of permanent flow, moderating the height of flood and the depth of drought. To stop a leak, the first thought is to place an obstruction into the opening. A study of the river and flood conditions in Pennsylvania has brought the suggestion from eminent engineers that the building of great reservoirs would solve this problem. These dams are to be fitted with machinery for the generation of electric power from which great good will be derived. All this is commendable, but it does not go far enough. It fails to begin at the very root of the problem, which in this State is the absence of dense forest cover. We know that not all the denuded lands in Pennsylvania will likely be reforested, but we do know that a large proportion of them are simply barren wastes usable for no purpose. These lands ought to be carrying a tree cover. We believe that as much of the solution of the flood problem lies in adequate tree cover as in a series of great impounding dams for holding back flood waters. Investigation reveals the fact that on a watershed 50% forested, with the accompanying forest floor litter and untouched by forest fire, a rain of one inch will disappear without surface runoff; that a fully stocked forest under the same conditions will absorb a 2-inch rain without surface runoff. Four-inch rains are not the rule in this State. Therefore, from fully forested watersheds nothing should theoretically disappear in surface runoff except that above the two-inch precipitation. The planting of open places and the banks of rivers and streams with soil-holding trees, shrubs, and plants would greatly retard runoff and erosion. From a forested watershed, therefore, capable of caring for a two-inch precipitation, there should be no erosion. A minimum amount of detritus would result from runoff in excess of 2 inches. To take care of the excess a very interesting device described by Dr. J. Russell Smith in a recent magazine article is worthy of attention. It is known as the agricultural water pocket. This is nothing more than a crescent shaped depression in the hillside surrounded by a ridge of earth on the outer or lower edge, designed for the purpose of holding surface water which may come down in the form of runoff. These are placed in rows and at such intervals that what escapes one will be intercepted by another. The forming of innumerable little pools thus prevents erosion and a waste by runoff. They conduct that water into the deep layers of the soil, where it becomes more or less stable soil water and elevates the water table. The water pocket seems to present itself as a useful device in the case of a forested hillside for the prevention of excess runoff. Should it conform in practice to its promise in theory, it certainly would seem possible to take care of a 4-inch precipitation.

Any forest cover saves soil by retarding runoff and changing it to underground supply. Even when the forest cover is saturated, it gives off water at a slow rate. The mechanical hindrance of the forest, plus the use of the water pocket device, ought to act in the same way as the large storage reservoir.

The engineers of the Pittsburgh Flood Commission have recommended that some 40 of these reservoirs be built. The cost will certainly be enormous, calling for probably not less than $40,000,000. With the watershed in its present uncovered and unprotected condition, erosion will continue without hindrance. There is nothing to prevent the silting up of the reservoir and rendering it useless for the purpose after a series of years. To introduce the reservoir system for the storage of surplus supply without replacing in part at least the forest cover on the watershed, will mean the adoption of extensive dredging operations or of scouring sluices almost from the very start. It is probable that this feature of the situation has not yet been much thought about. In our eagerness to control the flood problem, shall we make the mistake that the French made in Algeria, or that was made in Texas in the construction of reservoirs, only to have them filled up level and rendered useless for the purpose? In our own State, one storm is said to have brought down 40,000 cubic yards of detritus into the reservoir dams of Altoona. In the Austin, Texas, dam, the silt amounted to 968,000,000 cubic feet at the end of four years' use, and was 23 feet deep at the upper face of the dam. To be sure, silting depends upon character of soil, gradient, and volume of runoff; but even in Pennsylvania we have conditions which meet the maximum of these demands.

The Pennsylvania Department of Forestry is growing trees by the million. It gives them away for the asking. It is ready, able, and willing to assist in reforesting any denuded hillside which ought to have forest cover. It is especially anxious to replace the forest cover on the hills of western Pennsylvania, and thus assist in solving the great Pittsburgh flood problem.

The second of the two problems before the people of Pennsylvania is the menace of plant and tree diseases. How long are we as a people willing to sit down quietly and permit the ravages of tree and plant diseases to go on all around us and pay little or no attention to them or to their effects? It is only when some overwhelming calamity comes upon us that we really awake. This was true on the chestnut bark disease. Its existence was known for years before concerted effort was undertaken to investigate it adequately or do anything looking toward control; but in that time the disease acquired too firm a foothold and while heroic attempts were made to solve the problem, it seems to have gone beyond our power. And yet it must not be thought that the effort to fight this destroyer of the wild chestnut tree was in vain. It called the attention of our people to this danger in a pointed and remarkable manner, and probably has made them keener and more alive to the danger of other pests than they ever were before. We are now confronted with another invader, mention of which has already been made in your presence. Shall the white pine blister be permitted to continue its ravages and destroy the white pine which is the most valuable tree for reforesting in Pennsylvania. Its quick growth and valuable timber render it ideal for the purpose. It is the tree to which Pennsylvania must look in her effort to restore forest to hill and mountain and for the many wood-demanding uses of the future. Shall we give up planting white pine and let the invader go on, or shall we plant pine and fight the disease? The Department of Forestry has committed itself to the latter proposition and warfare against the disease will go on with unabated vigor. At the same time, it preaches the doctrine, plant white pine.

REPORT OF SANITARIAN

By SAMUEL G. DIXON, M. D.

One of the most important problems we have to deal with in the safeguarding of the public health, is in keeping a constant watch over the milk supply of the people of the State in order that this product, in its many processes of collection, distribution and manufacture into butter, cheese and ice cream may be brought sweet, and clean and free from all germs of disease, to the table of the consumer. This is an arduous work and requires constant supervision in order that the best results may be achieved. "Eternal vigilance is the price of safety." The percentage of cream which is required by law is, through veterinary inspection, held as a rule up to the standard of 3.5%. But much of the sanitary supervision over the milk supply seems to stop here, and it is just from here on that this supervision must be marked with still greater vigilance if we, as servants of the people are to live up to the great responsibility vested in us of giving to them the products of the dairy, pure and uncontaminated by disease. I have, therefore, chosen this subject as the most important sanitary work you have assigned me.

The inside history of a small epidemic of typhoid fever which occurred in one of our large cities last fall due to insanitary conditions at the dairies, at the creameries and at the ice cream plant itself which used the milk and cream from these dairies and creameries in the manufacture of their products. You may then draw your own conclusions as to whether or not the processes in the handling of milk and its products needs constant sanitary supervision from the time it comes from the dairy cow till ingested by the consumer in the form of milk, cream, ice cream, butter and cheese.

About the middle of last August many cases of typhoid fever began to appear in one of the large cities of our State which when their histories had been taken and studied to determine the source of infection, pointed pretty clearly to the one conclusion that the typhoid infection came from eating of ice cream manufactured by one of the largest concerns in the city. Accordingly an investigation of the conditions with reference to the milk and cream used in the manufacture of ice cream by this company was ordered. The investigation involved the inspection of 1773 dairy farms of which we were able to inspect thoroughly 1675. Wrong addresses were given in many cases and certain dairymen on the list had moved away or had gone out of business by the time our inspectors got there.

Grossly insanitary conditions were found in fifty-five of these dairies—in some, the milk house was under the same roof with the pig sty, in others the cows had lain in their own manure and their flanks, sides, legs, and tails were caked with dry bovine feces, so that when the milk was drawn every up-thrust of the milker's hand would jar a shower of fecal dust into wide mouthed, unprotected, milk pail and at short intervals a larger dose was injected into the milk every time the cow swished her tail. Grooming the cows and washing their udders and bellies before milking was an unheard of thing in all these dairies, while in most of them the milker never thought of washing his hands before milking much less changing his dirty clothes to a clean suit of duck.

In none of these fifty-five dairies was there a clean floor or one that could be kept clean. Of these fifty-five dirty dairy farms there was a history of seventeen of them of typhoid fever or diarrhoeal disease within a few months to several years of the date of our inspection. On the remaining thirty-eight farms there could be obtained no history of typhoid fever, but the sanitary arrangements were disgracefully inadequate even where any semblance of such were in evidence. On each of the seventeen farms where there was a history of diarrhoeal disease Medical Inspectors obtained specimens of stools and urines of each individual suspected of being a typhoid carrier. In a number of instances they were unable to obtain specimens because the persons either refused to give them or promised to take them at some future time and send them to the Laboratory, but failed to carry out their promises. In none of the specimens sent to the Laboratory were we able to isolate any of the micro-organisms of the typhoid dysentery group.

The investigation involved the inspection of twenty-nine creameries which these various dairy farms supplied. There were insanitary conditions noted in practically every one of these and their methods of handling cream were faulty to some degree in every instance. No apparent source of typhoid infection was found in any of the creameries. It was ascertained in investigating these dairy farms and also the creameries that there had been employes working for two or three days and leaving for parts unknown. It was naturally impossible to find out whether any of these irregular laborers could have been a source of infection of milk.

The inspection of the building of the Ice Cream Company showed many insanitary conditions. It is true that the front part of the building open to the public had a good appearance; but in passing from that particular part to the rear the change was shocking. Three typhoid cases appeared among the employes of the Ice Cream Company, their onset dates being Sept. 1st, 20th, and October 1st. The patient who sickened on September 1st, worked in the factory for a week or ten days before he took to his bed, having "walking typhoid" during that time and wrapping bricks of ice cream while in that condition. We believe that some of the later cases in the outbreak might be charged to this man, but so far as our being able to state definitely the source of infection of the ice cream, we are not warranted in coming to a definite conclusion. The fact remains, however, that the dairies were filthy and those handling the milk were not much cleaner.

At the beginning of the investigation, the bacteriological findings in the case of ice cream made September 16th, showed a product which was nothing short of the findings usually made in the examination of raw sewage, running a total count of from 1,000,000 to 2,500,000 colonies per cubic centimeter and an enumeration of from ten thousand to over a million colonies of colon bacilli to the cubic centimeter.

As the investigation advanced and the dairies had been inspected and the manufacturer realized that a real clean-up and reformation of his processes of preparation of ice cream with which consumers were poisoned, laboratory examinations from day to day showed a gradual lessening of the number of all kinds of contaminating micro-organisms with a proportionate decrease in the number of bacteria indicating pollution from intestinal sources, viz: bacillus coli, until within a week or ten days before the investigation by the Department had come to an end on the 24th of November, the total bacterial count had dropped to from 54,000 to 60,000 per cubic centimeter without the presence of a single colony of the colon bacillus.

Laboratory examination of the sour cream from several of the creameries which supplied the ice cream factory showed a total bacterial count of from 1,000,000 to 3,000,000 per c. c. with a count of from 15,000 to 750,000 B. coli—practically sewage. The cream from seven or eight creameries supplying the factory, mixed and afterward said to have been pasteurized, at first ran total counts of from one to ten million per c. c. with a colon bacillus estimation of from 66 to 1,500,000. This condition was cleared up so that before the end of the investigation the mixed pasteurized cream showed a total count of 3,200 per c. c. with B. coli.

The raw cream showed up no worse than the pasteurized cream but the least that can be said is that it was none better. The raw cream from the several creameries was examined separately and with one exception a change for the better in its cleanliness was noted from one examination period to another till toward the last not an unusual total count of from 5,000 to 30,000 with no B. coli was secured in the examination of raw cream from all the creameries save one. Raw cream from this one source did not improve in quality and as a result the Ice Cream Company refused finally to purchase cream from these filthy producers.

The butter made at this ice cream establishment was fairly good so far as bacteriological examination showed, but occasionally we would get a sample which would run from 150 to 800 colonies of B. coli per c. c. The usual examination showed a total count of 18,000 to 192,000 per c. c. with no colon bacilli. The gelatin which was used to stiffen the ice cream in its process of manufacture, at the beginning of our investigation, ran a total count of 8,000 with 200 B. coli per c. c., but latterly the usual count was 80 to 100 per c. c. and contained no colon bacilli.

Rock candy syrup and vanilla extract used in the ice cream was almost sterile while the peach and chocolate syrups contained from 5,000 to 6,000 as a total count but no B. coli.

In the examination of the gelatin, 10 grams of the gelatin was melted in 50 c. c. of warm sterile water and one c. c. of this used in the test. In the case of the butter, 25 grams was melted in 50 c. c. of warm sterile water and 1 c. c. of this used in the examination.

The outbreak involved 1,830 cases which we censored, although there were undoubtedly many more cases of which we could not get accurate records. Of these 1,830 cases, not every one is due to ice cream, but they occurred co-incident with the epidemic and in the same localities. The height of the epidemic was on the 20th of August when 135 cases sickened. 1,293 cases, or 70.6% gave a history of having eaten this ice cream. 139 gave a very likely history of having eaten it, thus we have 1,432, or 78% which may be charged up to this ice cream.

The result of this investigation makes it certain that our dairies must be kept under strict inspection. It is also true that the dairy farmer should get a better price for his products.

PROCEEDINGS OF JOINT MEETINGS OF THE PENNSYLVANIA STATE BOARD OF AGRICULTURE, PENNSYLVANIA BREEDERS' AND DAIRYMEN'S ASSOCIATIONS, STATE HORTICULTURAL ASSOCIATION, STATE VETERINARY MEDICAL ASSOCIATION, AND OTHER ASSOCIATIONS, HELD AT THE BOARD OF TRADE BUILDING, HARRISBURG, PA., JANUARY 23, 1917 AT 7.30 P. M. AND JANUARY 24, 1917, AT 7.30 P. M.

RURAL COMMUNITY VOCATIONAL SCHOOLS OF PENNSYLVANIA

By PROF. L. H. DENNIS, *Director of Agricultural Education.*

Just one word by way of explanation. The moving pictures that will be thrown on the screen in about 30 seconds, illustrating the work of the rural community vocational schools of Pennsylvania, are by no means complete. It has been impossible in the time we have had at our disposal, to secure complete moving pictures; but we will be able to show you just enough to give you some idea of the practical work being carried out in the rural community vocational schools of Pennsylvania. Notice the name, rural community vocational schools in Pennsylvania. We shall, in the pictures that we shall show you, give you one phase of the work only, that is the work given to the boys. We have not had any opportunity as yet to take the moving pictures of the vocational work carried on by the girls. Just one word of explanation: In these rural community vocational schools, every boy spends one-half of his time carrying on practical work, doing things instead of studying about things. The other one-half of his time he spends in the study of regular academic subjects, high school subjects, if you wish to call it that, for the State gives liberal State aid to all communities that operate vocational schools. The State aid amounts to two-thirds of the salaries of all the vocational teachers employed by the school district, and the State gives from $900 per year to $3,600 per year to a school district for operating schools of this kind.

You may be interested to know that this is the first time a vocational school exhibit has ever been put on at any place illustrating the work done at vocational schools. The exhibit to which I refer is in the Emerson-Brantingham Building, where the big State show is being carried out. In this room tonight are 76 boys from these schools. Each school is sending a corn judging team consisting of two boys; they are here to compete in the corn judging contest tomorrow forenoon out at the State Corn Show. I am informed that every school has instructed these boys to bring home the bacon. They cannot all do that, but there is going to be keen competition. Somebody is going to win the prize. I think it is of interest to you to know that in this room now there are about 76 of these boys who have come in from all over Pennsylvania. I cannot explain things further to you, because the time allotted to me is of course very short. The speaker who follows me must get away early on account of making certain trains, and I just want to make a very brief explanation of the pictures so that you will not think for a minute that they are complete.

(The picures were then shown).

ORCHARDING AND SIDE LINES

By L. WILLARD MINCH, *Vice President New Jersey State Horticultural Society, Bridgeton, N. J.*

Mr. Chairman, Ladies and Gentlemen: There is one thing about the speaker tonight, it don't matter when he commences, he has got to stop at a certain time, so you can be quite easy about my not talking very long. If I had the time, I would like to say some very nice things about your exhibit which I had the pleasure of examining this afternoon, and the fine quality of a great many of the horticulturists of this State and the agriculturists whom I personally know, and also pay a tribute to what we have just seen, that you are actually bringing things to pass among the young men of the State. I never have any introductions; by the way, I am just filling in now; there is this to be said, that our experiment stations and our different boards of research are doing most excellent things and we are having a wonderful lot of information given to us from various sources, and yet we feel it remains for somebody to take these facts and data and from them to work on a practical basis and make a living out of the proposition.

Now I am not here to solve the 101 difficulties about the farming proposition; I am here simply to say that I represent what is called the practical end of farming, the bread and butter of it, if you please, and while so many boards have some magnificent state endowments which allow them to do things by way of research and search after facts, for myself I have to work with one hand and keep the wolf away from the door, and search the sand with the other so as to make both ends meet in that way. So the only apology I have for appearing before you tonight is this, that we want to train our young men that there is a good living in farming, that there is something that challenges the ambition of the most worthy of our young men and women. Speaking for myself, representing as I do the sixth and seventh generations of farmers on both sides, I take great pleasure in speaking on this topic of making farming a success. My first picture happens to be the old maternal homestead, and here you have the seventh generation of my mother's side taking up the farming proposition. We have here getting a good start; well begun, you know, is half done; and here are some South Jersey young folks. I will have to hasten.

I am to talk to you on Orcharding and Side Lines. Well, as a matter of fact, I cannot tell which I am, a horticulturist or a plain farmer. I am whichever the way the money goes. The last few years we have tried to take up about 450 acres of orcharding. At the same time we have over that in what we call plain farming, and I do not know which is the better of the two propositions; they are both paying today and paying pretty well. Now we are quite heavy in what you call the onion industry in southern New Jersey. This represents a sort of natural strain of onions. Had I the time, I would like to speak to you on what is called hardy and worthy strains of home-grown seeds and bulbs. I have a great penchant for things that are accustomed to climatic conditions and I believe it is far preferable to take that which you know as being a pure strain and immune from disease rather than having an importation of any so-called nursery or horticultural stock. Here we grow the seed and then take the seed of course and sow it in this way and then we raise the sets and this represents one of the activities on the farm, keeping up, as I say, a three or four-fold proposition, growing the seeds and the sets and raising onions in the spring. Here we are setting out the sets. That is what we call a field in most excellent tilth. We have paid great attention to the mechanical condition of this soil and you can see for yourself there that we have the proper condition for growing a crop of onions from sets. Of course we have set the onions in these indentations and pressed them firmly. In that way we can set about—I think it costs about $6.50 to set a single acre of onion sets in that fashion, no more than that. Here I have a bunch of high school boys. In the spring of the year they come to us, the sun sort of draws them out, and Johnny lasts as long as the job does. When they are through setting onions, they return to town after getting a little bodily exercise. That represents New Jersey the last week in March. Here is growing a field of onions; we have about 65 acres annually, and you can see here we have a very mellow condition of soil. I believe the scientists would call it friable. This same field has been in onions now for, this is the sixth year.

Here, by the way, are some Kansas friends examining New Jersey and its agricultural advancement. That represents a field four years later than the picture previously taken above. We have cropped that field in succession for over six years and are planting the seventh year to set it in onions. It has been a money-maker proposition. This is the way that we cure our onions. With our light soil, the yellow and red onions, come up in the morning, we put them in bushel hampers in the afternoon and often have a sale by 9 o'clock the next morning. That is going direct to the market and you can see there it is a very rapid process; it converts onions into cash. There is a load of onions of the season of 1914; they netted us $187.50, 50 bushels on the load. They don't always do that, but they did that year. In 1915 they were about as low as they were high in 1914, but 1916 gave us good results. Now I must pass on quickly to our method of plowing. We are great fellows for deep plowing. We never plow less than 9 inches. That represents plowing up a heavy clover sod; 17 horses are employed in the operation. Here is the corn grown on that ground. This young lad is 5 feet 4 inches in height and the corn had not attained its height when the photograph was taken. This picture was taken a little later in the season; that is myself; my only apology is that I am there as a measuring stick—I stand five feet eight—to show you the height of the corn. One of the scientists said one day, "That ear is a little too high." I would rather find the ear where it ought not to be than not find any ear at all where it ought to be. When we began that farm we got about 34 bushels of shelled corn per acre, 56 pounds to the bushel. We are now getting 85 to 87 bushels on the same ground, simply by proper cultural methods and without any stable manure whatever. We are not buying New York horse manure any more, it costs too much, we don't need it. There is one hill just as I found it on that field, 3 stalks on the hill, three ears on each stalk. This is our method of utilizing the corn fodder or stover as it is often called. Of course we sell a catch crop in corn. You find here clover, rye and vetch; sometimes cow-horn turnips. We use these machines in chopping up cornstalks. In that way we get our ground full of humus. Chemical tests show that we get an abundance of potash in this fashion and get better results than we would get from 12 large loads of New York horse manure per acre, at $3 a ton. Now here is the field as it goes into winter. You can see here some of the vetch and cow-horn turnips; see the stalk clear out; in that way we gather the snow. Our later snows are very valuable in southern New Jersey; they do not drift and we try to have material on the ground that is rough and will enable the snow to catch and not drift all over our fields. We generally follow with tomatoes. This is a very valuable method of producing humus for tomatoes. We are very extensive growers of tomatoes. Last year we got $75 a ton, which was an exceptional price, for part of our tomatoes. Some of our fellows called them "tomartoes," but we generally call them tomatoes when we get $10 or $12 a ton. A real typical Jerseyman that don't make much out of them, calls them tomats. So it is altogether a matter of money how you pronounce them. This is a field of "Bonny Bess" just before they were ripened. They were put in four feet and a half apart, and you see how they entirely covered the ground. We got a very good crop; grew 130 acres with very good results. That represents the noon hour. The farmers accumulate during the noon hour, waiting for the buyers and shippers. After dinner it is shipped to Bridgeton. Last year 20,000 baskets were shipped. We represent the buyers for about one-half of that quantity. Here we are loading along the Tahancy River and here we are loading the barges with these tomatoes.

I haven't got time to stop on each picture, but I want to say a word or two about strawberries. This is a Dandy berry, which was originally started about 7 miles from this farm. My brother and I had been able to secure as high as 10,000 quarts per acre of the Dandy berry. It is a very valuable berry to ship to long distance markets. You see we use the Patty drill and after we are through picking strawberries the second year, we gather vegetable matter and plow under. You can always grow a good crop after growing strawberries. Here we are in the strawberry field. There are some of our friends who always come to see us during strawberry time and peach time, and you good folks in Pennsylvania, I now invite you to come in strawberry time or peach time or any other time you want to come and you will always get something to eat. Here they are picking strawberries; that is what you might call direct to the consumer. (Laughter) About the only middleman concerned is somewhere about here, (indicating the stomach). It is canning on the spot, that's what it is. (Laughter). We are always glad to have our friends visit our Dandy berries. There is a quart of Dandy berries. Now I want to say in behalf of our farmers, that we are coming to understand the wisdom of good packing. We are trying to please the eye and tickle the palate and sometimes pick the pocket, but anyhow, we have got to please the eye and tickle the palate, and people are glad to give us something by way of compensation. There were three layers in that box. This represents the top or face layer of that box of Dandy berries. Here we are showing you one of our clover fields. We are extensive growers of clover and alfalfa. This is a bunch of young ladies from Kansas out there. They don't ask "Does Kansas grow alfalfa?" But, "Does alfalfa grow Kansas?" This is one of our red clover fields that we cut once, then plow under as a vegetable material for making humus. I had Miss Hill stand by this cutting barrow, 8 foot cutting barrow, and I think I bought it from a firm in Harrisburg, we buy a lot of machinery from Harrisburg and we are very enthusiastic over these cutting barrows and we can work much better than we could with the old-fashioned four and a half or five foot cutting barrow. We are doing as much work with one good team and one machine as we formerly did with two machines.

Here we are planting alfalfa. I haven't got time to stop on that—I could talk on that 20 minutes. We have about 100 acres in alfalfa. The first thing we do, we try to get a well-drained piece of land. This follows potatoes. There is a potato right there and we very often follow potatoes with alfalfa, and we get a clean field and a well-drained field. We buy limestone from Pennsylvania, buy generally 20 cars of Pennsylvania fine ground limestone, so we are paying a pretty good tribute to you folks over in Pennsylvania. Then we are careful about our inoculation, sow the alfalfa by way of inoculation and it gives the very best seed we can buy, and rake it in the ground and repeat the process with the roller. Here you have got the whole process, sowing the seed with alfalfa; there is the alfalfa field; we generally have what we call alfalfa day there. By the way, I heard some of you talking about Senator Topp, who stands right here. This is Prof. Agee, whom many of you in Pennsylvania know. (Applause). Yes, he's all right. He has got me in a lot of trouble. I happen to be on that State Board over there and he is Secretary of the Board and makes me about as much work as any man I have ever been associated with, the only difference is that he gets $6,500 a year and I am on the Board without compensation, serving as a loyal citizen of New Jersey. Look out for these Commission Boards, boys. Anyhow, he is very good to us and is a valuable man, mixing with friends and farmers and giving instruction to the youth. And there is Mr. Jeffries and here is a visitation to one of our alfalfa fields. We like to have such days; it pays us well to stop, once in a while, in our busy work, and think about other people and other things and have a little converse together. You know when we first began to grow alfalfa we used to get the machine out and look at the clouds and wonder if it was going to rain and asked every old prophet there was, up and down the road. We don't bother that way any more; we are reasonably sure of a clear day, get out every machine we have got and go to work. We have got lots of things to do, and make it all in all, better take it all at once and have it over with rather than ask every day whether it is going to rain or not. Here we have three machines, and anyhow it doesn't matter very much after you get your alfalfa in the shocks, because, whether it rains or not, it will cure just as well. We think very much of curing alfalfa in that way.

I have some stories, but I haven't got any time to tell them. But the other day I got notice that there was a certain man that married a woman over in Pennsylvania and his mother-in-law came along with him and he was riding by this farm and his horse "cut up" a little and she got a little damaged and he served notice that he was going to bring a lawsuit against me because I had a lot of sheep hung up along the road that frightened his horse. I told him that was not the way most of our Pennsylvania friends talked and I hoped we wouldn't get any mothers-in-law from that state. There are some alfalfa roots four years old, 56 inches long, and last year we plowed up some six year old fields where the roots ran, as far as I could measure, 84 inches in length. I don't know how much further they were going. I want to say one thing in defense of my own state—don't think it is all sand over there, please. There's 56 inches before you reach much sand, and there's twice 56 before you get a real layer of sand. There is Atlantic City way down there, but that is a playground, that is what costs you fellows so much money. Some of you think that is all of New Jersey. This is what costs us money; nothing like the pet line to tie the youngsters to the farm. Here is a pet rooster; here is Ida with her dog; here is little David with his dog, and little John has got nothing else to hold, so he is holding his knees. There is the way to spend the noon hour, get acquainted with your own family and bring them in touch with the more aesthetic side of farming, and when they get older they will choose this for their vocation.

Just a word or two about our method of growing potatoes. I showed you a moment ago one of those corn fields chopped up, what was called corn stover, and here we are running this pulverizer and we are getting ready for planting potatoes. We plant about 300 acres, both early and late, generally about half and half, some in March and some in August. Here we are planting potatoes in March; there are two plows going down the side. There is the fertilizer and here is the planter. When I was a boy I had two brothers, one older and one younger than I, and the three of us planted an acre a day; this plants 8 acres a day. We do not sow our fertilizer and then plant our potatoes; we sow our fertilizer by itself, two rows, and then follow it up with this two row planter, and one man and two horses can plant 8 or 8½ acres a day. Then we cultivate potatoes sometimes before they are up. The potato bugs—it is only a question of how you handle them. One bug don't do any hurt, a dozen don't do any hurt if they are in different places, but when a dozen bugs get colonized, you have got into it, so we dis-organize the bugs; we run those cultivators up and down the rows and cover our potatoes entirely up and the bugs don't know when they are going to come up and we save many a crop of potatoes when our neighbors are injured by the early frosts.

I am very enthusiastic over early cultivation, just about the time potatoes are appearing through the ground. They are riding cultivators; that is my brother's grandson, the seventh generation of Minche's on the father's side to be farmers, and Horace Roberts, of Morristown, says he has got the set of a farmer. We hope he has, hope he will still like it. There is one row without any fertilizer. There is a field of grain that had as much stable manure as any I have ever known, but here was an accident; the machine got caught that day on one of its drills and we had no fertilizer down that row and only had a third or half a crop and not very merchantable at that. Here we are spraying. I haven't got time to stop, although I would like to, but in that way we control the blight and have no injury from bugs. The whole operation costs us $6.50 to $7.00 to spray for the four times. We use a power sprayer and go under the vines as well as over the vines and leave no part of the leaf untouched. I am very enthusiastic over spraying. There is a field that has been sprayed and carefully attended to. It is free of disease, as far as any blight trouble is concerned, and gave us a yield of over 100 barrels. That picture was taken the 18th of June. There is an example of rye. Here are new potatoes coming out from all these cross-rows. When we pulled out the vine, there were something like 30 small potatoes on the top of the ground. Don't allow any man to sell you seed of that small size, when they come from diseased plants. Never buy your seed of second size when they are taken from plants diseased in that fashion. I haven't got time to stop on this; I would like to; that represents a loading scene. We have one of these what we call Gordon potato-sowers; we bring them up here from the wagon and pour them in, separate the prime from the No. 2, pick out the No. 3 and the dirt and send them back. When a man buys potatoes, he don't want to buy your farm, he wants to buy potatoes separately, therefore we find it best to separate and grade our potatoes carefully like men do who grow apples. We are running them into the car.

I have had a lot of experience in shipping and have had a lot of complaints about short accounts but never any about over-accounts. I have loaded 250 cars a year, and very seldom a car but what has 2 or 3 bags claimed to be short. In this way we verify our account. There is a potato field that has got 887 baskets, 5-8 baskets, from 2½ acres, making about $1,330 out of that 2½ acres. Perhaps you have been reading of the oil wells at Millville, New Jersey; they had an awful time down there over oil. Whether they have got oil or not, I don't know, but we have got a gold mine right here in our potato field, we are sure about that, so we are not bothering about oil wells. Here is a field of onions. Here we are digging potatoes; we have got a gasoline digger and two of these four horse diggers, and as a rule the gasoline digger is laid up for repairs while the horse machine is doing the work. Here is one hill of red skinned potatoes; I dug that before witnesses and had them weighed before witnesses and they weighed over 6 pounds after they were dry. 18,000 hills on an acre and at the present day they are worth 20 cents; that one hill; that gives you $3,600 for an acre of potatoes. Never mind about my mathematics, they are all right; the only thing is you have got to have 1,800 hills like that on the field and get the present price and you will get the result—$3,600 for every acre of potatoes. We are selling red skins today and are getting about $1.90 net to us per bushel. There is a field of clover taken this last fall, the middle of September, planted after potatoes. I just want to show you our method, after potatoes, of sowing legumes and cover crops and here we have a field of red clover sown after potatoes, which is our best time for getting a grass crop. You can see the ground nicely covered with a solid growth of red clover.

Now I was to talk to you on orchards and side lines, but I guess the side lines have got me off; I will have to hurry. Now then, what I have shown is simply this; we lay great stress on our soil fertility; we never put in a crop until we get the ground good. We can grow anything then, most any way we want. We bought this old farm and there was a pippin tree on it 54 years old. We had it trimmed by our friends from the New Jersey Experiment Station. Near that was a tree 95 years old, but this pippin tree was 54. There is the same place next spring; we had it trimmed and all carefully sprayed. The fence was all torn down and you can see how we revised that old orchard and are getting fine results. In fact one single tree of that pippin orchard in New Jersey grown by Mr. Mulford near Roadstown produced 35 barrels of apples in a single year, and Mr. Hale, of Connecticut, said that sounded like a big story even to him. I have known a man that picked 70 baskets just driving around under one of these trees and reaching up from the wagon. With us it is a wonderful tree. I know a tree down there 3½ feet in diameter owned by a man named Diggs; it is a natural product of southern New Jersey never found anywhere else, and shows what a tree will do if properly cared for and nourished and sprayed. Here is an old-fashioned winesap tree. This tree gave a neighbor of ours a yield for 3 or 4 years of 35 or 40 baskets on this single tree, and we got the inspiration for growing apples from seeing our neighbor picking apples from this tree. There is the same tree another year, and you know what 25 baskets of apples on an average will do for you.

There is the Buttonwood Farm, and I want to show you the belting of this farm. We bought this farm for $2,500, 58 acres of upland, and there was 14 acres that the man threw in, in meadow, said it wasn't worth much anyhow and if I would give him $2,500, I could have the farm and the whole thing put together, and I scraped up $20 to bind the bargain with and bought it. It was an old abandoned farm just south of Bridgeton, New Jersey. The old fields were good hunting grounds in the winter and fine places to get blackberries in the summer. We went to work pulling out the old pear trees and cleaned it up along the road. Next year we began to put out orchards and used a great deal of bone; we used bone and then we used cover crops, and if the ground was a little bit poor, we sometimes used stable manure for a starter. That shows you the farm the first year, the coming of the young orchard. Here are the teams sowing lime over the cover crop. You can see that we have had potatoes in this field; you can see the vines about here; now we are sowing lime and in that way we get magnificent results. I don't care for the lime unless we have the cover crop; that seems to work well in our soil and produce the humus material. We can get twice the growth with cover crops, with your Pennsylvania fine ground limestone. Here are the trees, intercropped with potatoes in the fall of the year. Next spring we began to put in rhubarb; that is always a good thing to do, but we had to have money and that farm has been paying its own expenses. We got a good crop for two years; it was remunerative and kept down the expense account. Here is a portion of the farm in Deemer pears, and I don't care what anybody says, so far as the money goes, personally I think this is a most excellent pear. Here are 47 miles of green peppers in this pear orchard, in a straight line. This shows the Buttonwood there in the distance; this is a winter scene showing how we trimmed the trees and developed the young orchard. I haven't time to stop on that. Here we are showing the beginning of the first crop.

This is the beginning of the sixth year; the sixth year we had a pretty good crop of apples. Here is the first crop the seventh year; now we had a magnificent crop of yellow transparents that brought a good price and more than paid the expense account of the orchard in which these apples were grown; and there are the Buttonwood trees. There is the Williams Red on that same farm, the pride of the Buttonwood. That has been a very profitable apple on that farm. There are the Kieffer pear trees again, showing the development of our method of trimming and the prospects of the crop for the season of 1915. There is the Williams Red apple. I left that tree; there came a rain storm the night before and you see the result, but I got the apples even on the ground. Our method is to till the land and pulverize that land and we can pick up the apples just as if they came off the trees and shipped them the same day. We count it a valuable thing to have our ground well pulverized, and we get 5 and 7 baskets off a single tree. There is one of New Jersey's bright boys, only two years old. I was out there and saw him eat the third apple. You know that old saying, "An apple a day keeps the doctor away;" I guess he is going to prolong his earthly stay quite a while, for he was packing them in that day. Here is the same orchard showing the Red Astrachan section of that orchard. I am told that we have the largest Red Astrachan orchard in the east. It is a very valuable apple. You see the cover crop that was taken the last of September in the Red Astrachan orchard. There are the pears again; a man who grows Beaver pears will have wood whether he has pears or not. There is a winter scene in our orchards, taken last winter at the end of the 9th year. We had what we call an ice storm; the trees sparkled as though they had diamonds tied all over the branches.

There are the cover crops. There is the beginning of a peach orchard. We began by sowing this cover crop, cowpeas after potatoes. I want to show you, in a few minutes, a peach orchard of 13,000 trees. We were not quite satisfied and thought we'd better grow some peaches. Here is the peach orchard and here we are growing red potatoes in the peach trees. You see it is up almost to my waist and we got 100 barrels the first picking (and that was a dry season) due entirely I think to the growing of cowpeas the year before. That gave us the humus to absorb the moisture and carried us through a very dry season. In 1914, in the spring, we had 3 months or about 60 days without any rain and scarcely any dew, and the fall was about as dry, yet we carried that crop through on account of using cowpeas and having plenty of humus in the soil. There are pumpkins growing in your orchard. I haven't time to stop on that picture, but they make mighty good pies, I tell you that. Don't put it off too long. I have got some in the cellar now and I have my own fresh eggs. There we are growing beans the next year in this young orchard. Here we are cutting the spinach. Our method is to always keep money coming in, never have your land idle, it helps to carry the expense account.

There is the orchard in 1916, growing 13,000 trees, and we had this past year, on the 9,000 trees over here, about 5,000 baskets and they brought a very ready market; were sold almost exclusively in the city of Bridgeton, and you know with the incropping that was a very paying proposition. We had onions in this section of the orchard and potatoes on the other row, so we grew something in every section of the orchard and grew the peaches on the trees at the same time. I do not know whether any of you are politicians or not, but that is Senator Minch. I stood over there and asked him if he would hold this tree and he thought I was having my photograph taken, but I got out of it and had him in it. I put him over there to show the height of the tree. He stands 5 feet 9, so it gives you an idea of the height of the tree, and I had this young school teacher stand out there, and she stands, I think, 5 feet 5. This shows the method of dealing with the peaches around the trunk of the tree on these small branches, and you know that makes the early fruit, trim them and you get the early fruit. A miss is as good as a smile. I had this young lady stand in there and while I was not looking, she nipped that peach. That shows the champion variety, three years old, and all one tree; it gives you an idea of that young peach orchard.

Now I haven't got time to tell this story, but you know we have got a great many vacant lots in our cities. There is a lot that belongs to the Treasurer of the Cumberland Trust Company of our city; he had 3 or 4 what we called vacant building lots, and he conceived the idea of using city water for irrigation and hiring this man to grow truck farms and I happened to see his books last Friday on those three lots. This present year he sold over $2,000 worth of vegetables, mostly in our home town. That shows what can be done on those idle lots around our cities if we have the ambition to improve them, and he has still more vegetables and celery to sell. This represents the growing of celery on Mr. Ware's vacant lots. I saw the expenses. He shows that fertilizers and other expenses came to $600, which left him $1,000 for himself and the man, and then he had $400 still to divide. That is not such bad business after all, is it? Talking about this high cost of living, who is to blame for it? Some of my neighbors bother me to death about getting some of my eggs. They have got as much land around their houses as I have, but they don't want to be bothered with the pesky hens. If they don't want the bother, the only way I can do is to charge them a good price for the eggs and take the bother myself. If we had a little more ambition to improve these idle lots, I think we would grow enough to keep the people alive and reduce somewhat the cost of living and increase our profit. There is a school down in Cumberland county that I found one day when I was out riding, which represents the character of the young boys down in the lower part of our county, and I commend them to you as the coming farmers and farmers' wives of southern New Jersey, and Ithink those of us who are in this work, if we lay before these youngsters the proper inducement in the way of farming and fruit growing, we will have coming up around us an intelligent lot of young men and young women that will surely bring things to pass.

Now, I have got to go because the train has got to go, and I want to say to you folks, as I said to one of our good friends here this afternoon, "Come over to New Jersey." He says "It's so much further for us to go to New Jersey than for you to come to Pennsylvania." I said, "I can't see it." So, if any of you have any interest in southern New Jersey and have the time, just jump into your car and come down to Bridgeton, and myself and my brother will be glad to show you around. I thank you very much for your attention and certainly wish the State of Pennsylvania well. (Applause).

POSSIBILITIES OF COMMUNITY ORCHARD MANAGEMENT

By A. FREEMAN MASON, *Extension Horticulturist, State College, Pa.*

Gentlemen, I have a rather formidable bunch of papers here tonight which I am going to use occasionally as notes, because a good bit of the talk that I am going to give is from figures and from data in which I have to rely on notes in order to bring the material before you. When we get to talking about the possibilities of community management, we are distinctly in a co-operative field. Every time we get to talking about co-operation, we start hammering on a subject which has been hammered on so much now that it is old stuff to a great many of the men here. In taking up the subject of community management then, if I seem to repeat what you have heard from a number of other speakers and will hear from a number of others still, why you will have to forgive me for repeating and will have to forgive them later if they take up any of the topics about which I speak.

In coming to the opportunities for community management in Pennsylvania, we are confronted with a great many different obstacles and a great many points in favor of community management as well.

In the first place, day in and day out, we hear the question, "What can we do to improve Pennsylvania fruit? Why can't the ordinary farmer get as much money for his apples as he reads about the westerner getting or the big grower getting or the grower from some other section getting?" In the first place, we have one prime reason, and that is the average Pennsylvania orchard is small. They list us in the government reports as having the second largest number of apple trees of any State in the United States; they rank Pennsylvania second; yet, going through our State, unless you confine your observations to some of the counties in the southeastern part, you wonder where Pennsylvania gets enough trees to make it rank second among the apple states. The answer is that the Pennsylvania trees are in the small farm orchard, 25, 50, 75 and 100 of them standing on the hillside or in the corner where you don't count them up in riding along on the train. The average Pennsylvania farmer cannot afford to buy equipment; he cannot afford to handle his orchards in a way that will bring him the returns that the large commercial grower can get who can afford other things and the best equipment for orchard work.

There is another thing, too; we must take into consideration the age and size of the Pennsylvania trees. Oh, our grandfathers and great-grandfathers planted those trees; most of them got clear up out of bounds where it's hard to take care of them, where the fruit we do get has to be knocked down or shaken down. Understand I don't mean all the trees, but a large part of them on these ordinary farm orchards are such that they cannot produce good fruit economically; the age and size of the trees are against the farmer. Then another thing is the great range of varieties in the orchard. You go down to any farm orchard in Pennsylvania, and the farmer can give you an Astrachan, a Transparent, an Early Harvest, a Smokehouse, a Baldwin, a Spy, a King, occasionally a McIntosh, a Fallawater, a Russet —he can run the whole gamut in one orchard of 100 or 150 trees, so he cannot handle that large number of varieties alone and get the money out of it; he hasn't enough of one variety to demand the best market. Then there is his distance from big markets and his rather unique location in respect to the local market. Now, we have plenty of small markets around the State here that will consume tremendous quantities of fruit. Those small markets are not very particular at the present time as to the quality of the fruit they get. They do not pay a big price for any kind of fruit, because they are more or less satisfied with poor fruit. If he wants to tap the big market, the market that is particular about the quality and the size and the condition of the fruit, he has to ship that fruit a long distance, which, in his case, having only a small amount of fruit and a very small amount of each variety, is out of the question. So you see our Pennsylvania farmer has not an easy proposition when he gets to figuring out how he can get the prices for his fruit that the large grower does, and that the fruit grower located near the big markets and the particular markets can get.

Now, we have certain things that go to make up the ideal fruit farm. For one thing, we have to get the proper orchard unit, the proper economical unit. We have a few bulletins out on that subject, where men have taken acreages or they have even taken whole states, and have, by sending out vast numbers of personal letters and questionaires, found out just about what it is costing men to produce fruit and about what is the right number of acres to have in order to produce most economically. Most of these men will tell you that about 20 acres is the one man, one team unit, between 20 and 25 acres is the unit for one man and one team. Now that works out as a unit in one other way; you get a spray outfit, a spray rig, and you can cover around 7 acres of old trees a day. Some days you will not cover that much; if you have good conditions, you will get 7 acres a day of good big old trees. While occasionally, while usually our spraying season last several days in each particular, we very seldom can count on more than between 3 or 4 days of good spraying weather at the particular time spray should be applied, which means that with one spraying outfit a man can take care of between 20 and 25 acres, so we have a unit in that respect. So, as I say, most of these orchard economists will tell you that between 20 and 25 acres is your orchard unit. Now we have then, in order to get the proper economic unit in a community management proposition, got to get together enough orchards close enough to give us approximately 20 acres of fruit. As long as we are working on smaller units, we cannot produce cheaply. Just compare the man with two acres and the man with 20 acres.

Take the matter of spraying; take the man with the ordinary barrel spray, with the Armstrong motor with which the man will spray, if he hasn't more than two acres of orchard; he will spend a full day spraying 2 acres of orchard, and spend a hard day. He will use one man to spray, one man to pump and mind the team, and one team. His total cost then, counting his time at 20 cents an hour and the team at $2.50 a day, if it is his own team, means that he spends $6.50 a day simply to get the spray on, besides his spraying material. His overhead expense then will be $6.50 which, on 2 acres, is $3.25 an acre. Take the same man with 20 acres, who can afford to have a power outfit which sprays 7 acres a day; he does it with one team and 3 men, which means that by adding $2.00 to pay for one man, he can spray 7 acres a day, making his overhead expense around $1.15 per acre. There you have a difference of $2.10 an acre for spraying overhead. I am not saying that those figures are exactly what you are paying for your spraying or what some other man is paying for his spraying, but take it as an average, it is just about what the man is paying for his spray. That puts the cost of production at $2.15 per acre for individual spraying behind the man who has the larger acreage.

I would like to call attention to other community advantages, to the buying possibilities. The man with 2 acres cared for in the ordinary Pennsylvania style only buys a few pounds of arsenate of lead, a few gallons of lime-sulphur, a few boxes—measuring them by the dozens. He pays for these our biggest retail prices. Take the matter of arsenate of lead in powdered form; if it is bought by the pound, it is 25 cents a pound; if bought by the 10 pounds, it comes down a cent; if you buy 50 pounds, it comes down another cent; if you buy 100 pounds, it comes down another cent; if you buy 300 pounds, it comes down another, so by the time you get to buying it by the 300 pound lots and up, you are paying 5 cents a pound less than the man who buys in small quantities. Dr. Fletcher, who will speak to you tomorrow morning on some orchard topics, tells us that by getting a cooper to come around and make his barrels when he has a few thousand barrels to make up, he saves 9 cents a barrel. A man on small acreage cannot buy that cheaply. Orchard machinery runs up as high as 40% in profits, as high as that, not all machinery has that margin, but it goes that high. For anything the man buys in small quantities he pays a high price, while in a community proposition, buying in large quantities, you save a considerable percentage on every item.

Then, we have marketing advantages. We have the advantage there of the big grower in being able to put enough fruit on the market to command a market over a fairly long period of time. When you develop a market, you want to keep your market. If you are going to supply them with fruit for a few weeks in the year, you cannot possibly hold your market. If you could command their attention right straight through the year, you can hold those people even though your prices be a little high. If you have a little fancy fruit, if you can get them in the habit of buying from you and serve them week after week right straight through, you can command a much better paying market than if you only appear before them 2 or 3 times in the year. The wide range of varieties in the ordinary orchard makes it impossible for the farmer to do that; the small amount of fruit works the same way. You lengthen the season in local markets and cut down hauling expenses by being able to haul larger quantities at longer intervals instead of having half a dozen or a dozen men hauling small quantities over the same distance and consuming the same amount of time. There is one point, and that is, if you are catering to the same market, community work cuts out that price-cutting competition which you find in so many cases. Take, for example, out in New Wilmington, out in New Castle, we have a number of vegetable growers around New Castle, growers who are having quite a time keeping prices up so they can make a decent interest on their investment, simply because one man will go down the street selling his stuff for such a price and the next man comes down offering his stuff at a lower price, and they get that price down and down until they won't make any money. They knew that and they got together, and now they keep an agent in Pittsburgh—I imagine we have one of the members here now who can tell you something about this later—they now keep an agent in Pittsburgh who sells the extra stuff they cannot sell at a profit on the New Castle market. That is not the only example; they are doing it in a great many other places in the State, and cutting out that price-cutting competition.

There perhaps is one feature that stands out as prominent as any, and that is in community work your standards, your grades, every grower shipping under one label and packing under one label. Every grower puts exactly the same grade of fruit on the market; there is just so much poor fruit allowed in a certain grade; his best fruit has to come up to certain standards in order to be sold as his best grade. It standardizes the grading and packing, which is one of the most important features of any kind of community work, and the feature which has made possible the great advances some of our neighbors have made in fruit growing where they are handicapped by high freight rates and high production costs and where labor is not available.

Now one more point on the advisability of the Pennsylvania farmer going into any kind of a community proposition, and that is, it frees him from orchard work when farm work demands all of his attention, where it is so important. He spends more time on his general farm work than on his orchard, and this frees him just at that time to take up his farm work. Take for instance the ordinary Pennsylvania rotation: if we look at corn, corn starts in the first thing in the spring and conflicts there with the spraying. It conflicts again if he puts on a late scale spray; it conflicts if he puts on a scab spray, and it certainly conflicts with his codling moth spray, if he puts on a 10-day spray, it certainly conflicts there; if he delays his 10-day spray about a month until after the codling moth spray, as a great many commercial growers do, he may avoid a conflict with his corn at that time, but it may damage his fruit; and then again, late in the season, it conflicts with his harvesting. Take wheat; wheat does just the same thing. We will follow with oats; oats conflict in the spring with his plowing and sowing all the way through, the oats harvest conflicts with his third summer spray, the spray for the second brood of codling moths that come along the latter part of July. Wheat will conflict in the middle of the summer with the third spray; it does not conflict as much as oats and corn. Clover conflicts the least of all; it may conflict in the haying time, but all those conflict at some place and the farmer with the small, 2-acre orchard, cannot afford to waste a day from his general farm operations to take care of his orchard, because his general farm operations are by far the most important to him.

So, when the college, when some of the men in the association asked that the College look up the possibilities of community management, I began looking around the State to find a place which offered any chance for this kind of work. There seemed only two general districts where this could be carried out, one down around Altoona, in some of those orchards in Blair county, down in Bedford county; and along the Susquehanna River, in Columbia, Luzerne, Lackawanna and Susquehanna counties, where they have a great number of small orchards, none taken care of very well, the majority not at all, and the farmers pretty well discouraged over the outlook for fruit growing. Especially was this true in Blair county and around that section, so we took one community down there located in the cove regions, one of those long, narrow valleys, or where two or three valleys come in together, the trees being planted down in the hollow, leaving them comparatively free from frost; they'd call it the frost pocket if they'd see it there; between Martinsburg and Roaring Springs we found a straight stretch of road five miles long; on the first three miles of this road were between 15 and 20 orchardists, each one having between 50 and 250 trees; 15 of them in three miles. The distance between the first orchard after we come out of Martinsburg, and the last orchard in the group was only 2½ miles. These men were from 1 to 5 miles from Roaring Springs; they were 16 miles from Hollidaysburg, 22 miles from Altoona. They have a railway in Martinsburg. They have a quality of fruit that will not pay them to pack it up in barrels and put it on the car in barrels. If shipped at all on a train, the only way they ship it is in bulk, shove it on the car. To get their fruit to market then, these men haul to Hollidaysburg and Altoona, 16 and 22 miles respectively, the product of from 50 to 250 trees, their average load running around 8 loose barrels, taking them 10 to 12 hours to make the round trip and costing them around 40 cents a barrel transportation for cheap stuff in cheap packages to get to a more or less cheap market, because Altoona does not take a large quantity of fancy fruit. Ten of these men had 1,450 trees. To all 15 of the men the college sent the following letter:

State College, Pa.

Department of Agricultural Extension.

Each year the farmers of Pennsylvania waste thousands of dollars thru neglect of their orchards. The plea is made that their orchard is so small that they cannot afford to put in modern equipment or go to any other expense in caring for the trees.

The Pennsylvania State College is endeavoring to solve this problem, and at the suggestion of the secretary of the Pennsylvania Horticultural Society, is working up a scheme for community management of the neighboring orchards; that is—where one trained orchardist handles all of the orchards in the community as if they were in one big block.

A number of small orchards, comprising approximately 2,000 trees would be secured. An orchardist would assume complete control of these small orchards, buying a power sprayer, plows, cultivators, etc., sufficient to handle the whole group. He would prune, spray, cultivate, fertilize, pick, pack, and sell all of the fruit, giving to each farmer all of the money after expenses of operation were deducted. This would save the farmer himself having to work with his orchard when he wanted to plow or cultivate corn, or do other operations. Instead of several men taking numerous small loads of fruit into Altoona, one man would take a few large loads in. Glutting the market on certain days would be avoided and fruit would be had in sufficient quantities to make carload shipments in case there was more fruit than the local market could handle. All expenses would be divided up among the farmers on the basis of actual number of trees and the amount of time spent working with his fruit, the orchardist would be bounded to insure the growers, and the orchardist would keep a set of books open at all times to any of the men interested in the proposition.

The College is *not* undertaking this matter just at this time, but is merely investigating the possibility of this plan. As the district around Martinsburg offered unusual advantages for such a study, I am writing to you who are growers asking for as much information as possible. Answers to these questions in *no way binds* or *commits you* in any manner whatsoever.

Very truly yours,

A. FREEMAN MASON,
Extension Horticulturist.

Answering the qnestions I asked them in the questionaire which accompanied this letter would in no way bind them. I sent this questionaire and letter to each of the 15 growers and put in a self addressed, stamped envelope, returning to the college, of course. About three weeks later, having received not a single reply, I sent them another letter. Three weeks after that, having received only four replies, I sent them another letter, and a week after that, receiving no further response, I went down myself and went around through the district and talked to the farmers and got data on seven of the fifteen orchards.

Now gentlemen, the seven of the fifteen orchards revealed some very odd figures. In the first place, there were 33 different varieties named. Of the 1,450 trees, I saw growers representing 591 of these trees, so that the 33 varieties reported were 33 out of 591 trees, and in that number they didn't know 236. There were 244 unknown trees and these unknown trees very likely had a much wider range of varieties than showed up among these 33. Among them were Baldwins, 121 trees; Northern Spy, 8, etc., with the complete list being as follows:

Baldwin,	121	Stayman Winesap,	73
Northern Spy,	8	Old Winesap,	..
Jonathan,	50	Smokehouse,	13
Rome Beauty,	23	Russets,	1
Fallawater (or Pound),	4	Bellflower,	11
Rambo,	35	York Imperial,	32
English Rambo,	6	Ewalt,	12
Ben Davis,	10	Vandevere,	..
Black Ben (or Gano),	6	R. I. Greening,	6
Delicious,	11	Fall Pippin,	17
Wagner,	17	King David,	4
Pumpkin Sweet,	12	Maiden Blush,	21
Yellow Transparent,	8	Red Astrachan,	9
Early Harvest,	10	Unknown,	244
Grimes Golden,	10	Wealthy,	4
Pewaukee,	5	Black Twig,	20
Hubbardston,	18	King,	10
Paradise Sweet,	4		

The trees proved to be all in solid blocks; I saw blocks ranging from 50 to 250 trees, in every case in a square. Part of the men had pruned; four of them had pruned; two of them had not pruned at all. Two of them did not spray at all; three of them sprayed once, and one sprayed once and occasionally oftener. The only spraying equipment was the barrel sprayer which, of course, was the only equipment that would spray on a small orchard. Occasionally they cultivated; when they did, they cultivated in order to put in a grain crop. Occasionally they used manure and fertilizer; manure every fourth year had been the treatment of three of the men. The crop on 591 of these trees was 4,100 bushels in 1915 and 1,650 bushels last year—4,100 bushels this year and 1,650 bushels last year. They ranged from three-quarters of a mile to three and one-half miles from the railroad siding. Their road was a level road, straight road. The farm work interfered in every case, except one, with the general orchard operations. I don't know how it was that that odd man happened to handle his orchards without any interference, unless he was the one who did not spray, prune or touch his orchard. One man said that he was absolutely not interested in any kind of a proposition like this, and the other five were skeptical as to its possibilities, and the conclusion as to the availability of that community for this kind of a proposition—you see the conclusion is distinctly negative, because, if the growers themselves are not looking for a proposition of this kind, then a co-operative effort in that community certainly will not work. So there we are with the 10 growers and 1,450 trees.

What will it cost to stage a community proposition down there? Now, in the first place, we would have to get a salaried man and put him in charge, a trained horticulturist or man of practical experience. We could not get such a man without paying $75 or more a month, because he would have to get a man that had some organizing ability; so, say we pay a man $1,000 a year; that is $82.50 a month, which we would have to pay in order to get a man who would be strong enough to hold that kind of a bunch together. For equipment we would have to have a steam spray rig, disc plows, tools, wagons and other equipment to the extent of $1,125, and a packing equipment, including a shed, at a cost of $200, making $1,125 at least for equipment that he would have to have. Then his running expenses for the year taking it for granted he took 20 acres down there, just the amount these ten men had, his running expenses and the spray, $250 worth of sprays for the 20 acres, etc., making altogether $780 for his running expenses for a year, or a total of $2,905, which is $145 per acre. You can see when you talk $145 per acre to any general farmer, no matter how interested he is in his orchard, it is going to be pretty hard to convince him that you can pay out on a proposition of that sort, so it would have to be only the most enthusiastic farmers that you could get into a proposition of this sort. Now that $2,905 is $145 per acre for equipment; or, counting 30 trees to the acre, because they are planted 30 by 30, it is $4.75 a tree investment that that man would have to make in order to carry this proposition through to harvest time the first year.

Now, $1,125 of this is taken up in equipment expense which would not have to be duplicated the second year. Now the question that any financier would ask would be "Why are you charging that off the first year?" Simply because, gentlemen, in an organization of this sort, it would have to be charged up the first year because no one would dare run the risk of running this expense out for a long while. It would be hard to get a man to be willing to let this thing be strung out. If your orchardists went into this thing for one year with the expectation of going in for several years afterward, they might as well pay it all the first year, because then they won't have to pay it the following years. If, however, they go in the first year with the idea that if it does not work out as well as they want, they will quit, then they must certainly pay for it the first year or they won't pay for it at all. That is why we charge that equipment up the first year. The second year they only pay $1,780, or $88 an acre, $2.90 a tree for the succeeding years. Now, to pay out on this, counting the $2.90 a tree as bringing the crop up to the harvest time, it means that per barrel in the harvesting we have to add 60 cents a barrel, because it costs about that much to pick and pack a barrel; we have to add 60 cents to that, so that, to pay out, we would have to get three barrels of apples per tree and sell those for $2.20 a tree to the grower; that is, sell them in the orchard for $2.20 a tree, packed out, in order to make out the first year, paying this total amount. Now, subtracting $1,125 for the second year means that 2 barrels sold at $2.05 in the orchard would pay out, so anything above the 2 barrels per tree he averages, he would make money on. These old trees are all large, all the 25 or 50 year old kind in almost every case, solid trunks, solid in all branches, merely old, vigorous, neglected trees, A production of 4 barrels per tree would not be at all unusual if they were fertilized and cared for properly. I think any grower here with old trees, who is taking care of them would say that 4 barrels a tree would not be an unusual production if taken care of properly as outlined in the previous part of this paper In that case, if my figures are at all correct—and I think I have allowed sufficient leeway in every case to make the figures fairly reliable—if he would average 4 barrels per tree, he would have a net profit of $2.75 per tree, selling his fruit at $2 a barrel in the orchard, or $82.50 per acre.

Now, to sum up; taking into consideration the size of the orchards down there, the size of the trees, the cost of equipping the community proposition, after the first year the men would have to get 2 barrels of fruit per tree to pay out. On these old trees, on which a production of 4 barrels per tree would not be excessive, they would make, if they sold their fruit for $2 a barrel in the orchard, they would make $2.75 per tree, which, counting 30 trees to the acre, would be $82.50 per acre. After we arrive at this figure—I want to say that this is estimated because this kind of a proposition has not been carried out yet, and only when it is carried on will we be able to tell exactly what it is going to cost to run this thing, but by allowing liberally, I think that these figures are approximately correct. But, as I say, only when we do it can we tell.

To conclude. Community propositions will only work in Pennsylvania where we have a large number of small orchards close together, where the man will have to go not more than half a mile to get from one orchard to another; only where the growers are getting such prices per bushel for their fruit that they are discouraged and feel that they cannot make money by themselves and want a proposition; only where they are so far from the market that they cannot handle their own marketing problems successfully. When we do find such a community—and we have a number of such communities, we have the communities, but not the men—we can make it successful. Now I have 15 pictures I want to throw on the screen here which will just give a rough view of the community and the work down there. There was one point I neglected to mention that was very important. I mentioned that their production this year was 4,100 barrels from the 1,450 trees, and last year it was 1,650 barrels, for this crop in Altoona they got from 28c to 60c per bushel; the lowest average of any of the growers was 28c; the highest was 60c per bushel. It cost them 40c a barrel to get it there; that is about 14c a bushel, to haul it there, aside from their other costs. Here we have one of the orhards down there in that section in leaf. He is the only man that had a picture of his orchard in leaf. You can see the size of the trees; there is nothing special the matter with the trees except that they needed a little care; the orchard was used as a cow pasture or anything that came handy.

A Member: How tall are the trees?

MR. MASON: Those there are about 30 feet. That was a peach orchard in that same group, which does not apply to this group. The average specimen of apple that goes in from that section; fungus, scab, some scale, pretty near anything on the apple. Here we have that section. Here is Altoona, here is Hollidaysburg, Roaring Springs, and then in this section from Roaring Springs over to Martinsburg is known as the Morrison Cove district, and it is from this turn right here down to Martinsburg where that row of orchards of which I was speaking is located. This next map shows in detail the line of orchards, and here you will see the names of the owners. You will notice that the distance between these two is a quarter of a mile; here we have ½, here ⅛, ¼, ¼, ⅛, ¾ and ½. Now in along here are other orchardists. There are two on this side who have only about 30 or 35 trees. There are 10 or 12 of those men whom we did not interview at all, because we were taking only those who had 50 trees and above. The total distance from the railroad siding up to H. L. Smith's four year old Stayman Winesap is 3½ miles; from Mr. Metzger's here up to Mr. Smith's is a little less than three miles.

This shows the general view of that country. You see that you get the appearance, which is that they are down in the bottom of a hollow. You are pretty near right in drawing that conclusion. However, this Morrison's Cove has good drainage down the valley and good drainage up the valley, and somehow or other they escape frost year after year, always have a crop of very high colored fruit; they are on a moderately light soil, quite a little rock in it. I do not know the soil series; half a dozen series of soil run through that part of Blair county; I do not know whether Mr. Dunlap can help us with the soil type there or not. That was an ordinary orchard in that section. Here is one picture looking down this road which runs straight along here for three miles; it does not come out very plain; it shows the grouping there and a small orchard there and another down there. That is Hoover's orchard and there is another orchard over there. You see there is row after row of them on both sides down that road. Here we have one of Mr. Metzger's; he was the first man on that list. You can see the general style of the trees there; there are about 50 trees in that group, which runs on over here, about 5 trees further to the right, and occasionally a tree out; in a square block, easy to take care of as far as cultivation is concerned, although being isolated from other orchards, you would lose time going from one to the other. Next we have Mr. Metzger's orchard which is shown in this picture and typifies the general orchard conditions down there as well as any picture we have. Up here to the right we have a young orchard of Mr. Metzger's, which is shown in the next picture. He has 60 trees in his old orchard. Here is his young orchard, just coming on; he has about 200 trees in his young orchard. This is an individual tree in Mr. Metzger's orchard and it is perfectly typical of the bulk of the 1,450 trees of which I spoke. You can see they are headed out there at about 6 feet; they have the lowest fruit bearing branches at just about 7 or 8 feet, and when they come down to the end, they droop down about 4 feet. You could drive a load of hay under some of the trees, but most of them are just moderately high headed trees. We would have to take some of these upper branches out and it would mean slow renovation for the first two or three years and quite a little rough pruning on these trees the first two years. On the other hand, it would reduce the fruit bearing surface on those trees a tremendous lot to prune them.

A Member: Would you cultivate the orchards?

MR. MASON: That would be a problem that would have to be worked out. Some of these orchards we would not be able to cultivate, they would have roots so near the surface that you could not do it. On the other hand, most of these orchards have been put down in grain every fourth or fifth year so that you would not run much risk if they plowed for grain frequently. This is Mr. Hoover's orchard; he has about 100 old trees and 60 of the 100 were Baldwins. All those are solid in the trunk. None of those are the hollow trees you ordinarily find when you see an old orchard like that. Most of them are very solid, very vigorous, but just uncared for. This is looking down at Mr. I. H. Paul's orchard. The valley drops into the hollow down here; the valley drops 200 feet below Paul's orchard, the floor of the valley. It is half a mile from his orchard over the mountain, drops down 200 feet in that distance. Mr. Paul has about 225 trees on his place, of which about 100 are old trees of that kind.

This is Dave Mock's orchard. Dave Mock has not made any attempt to take care of his orchard and admits it. He has his fence rows running to the woodpile and everything else in there. A large number of the trees would not do very well for Mr. Mock until they have been cared for for two or three years. On the other hand, I walked through this orchard and there are only one or two trees in the orchard that had any kind of hollows in the trunks or had any big limbs that were dead. All those old limbs are alive. It means that the orchards are vigorous but uncared for. This is looking across at—well, it has gone from me now, I do not recall whose orchard that is there; it shows how they lay, one after the other, in small, square blocks of 100 trees each. Well, gentlemen, you can draw your own conclusion. You have heard mine. I was asked to discuss the community possibilities and I have done my very best on it and shown you a few typical pictures of some of the communities we have in Pennsylvania. If there are any questions or anyone has any remarks I certainly would like to hear them.

THE WOOL MANUFACTURING INDUSTRY

By MR. HART, *of Philadelphia.*

Ladies and Gentlemen: I have had this job pushed on me, but I will do the best I can. I have never seen these pictures before; I believe they have just come from Washington today, therefore I am not familiar with them. Before starting, I will make a few general remarks, that is to say, I am more familiar with the consumption of wool and the manufacture of it than the producing end which you men are connected; in other words, I don't know a whole lot about growing wool but I have had some experience with the handling and manipulating of it.

In our lives we have three important factors which are necessary to comfort or what you might term bare necessities, food, clothing and shelter. Under clothing comes wool, the most important raw material, especially in the Temperate and what you might call Frigid Zones. The value of wool as a clothing material for the colder climates is due to its property of being a non-conductor of heat. In other words, woolen fabric will keep the warmth of the body between that fabric and the body itself and only slowly pass it through to the outer air. Now the value of cotton and linen as a cool material is due to the fact that it is a good conductor of heat and will readily pass the temperature and heat of the body through to the atmosphere.

Now, as regards wool in general, Mr. Bigelow stated that our tariffs had been based upon three divisions of wool, namely: Carding wools, including the Merinos, combing wools, mostly of the British type, and carpet wools, those of native origin coming from Asia and countries which had a semi-civilization. I would also like to add a fourth division which meets the present requirements and meets the present market classification of wool and that would be this, first, Merino sheep or cross-bred sheep containing a large percentage of Merino blood; second, the British type of sheep mostly producing combing wools; third the cross-breds, and fourth carpet wools. The third or cross-bred class, nearly all of them would be combing wools. Now the fourth class would include both combing and carding wools, mostly carding. Such wools are very irregular, showing more breeding, containing a large amount of kemp and being very wasty, coarse and general, and principally used in the manufacture of carpets. The other three classes are principally used in the manufacture of clothing.

The method of manufacturing clothing, that is cloth, are those yarns which are spun on the woolen system, which is a rather short process and far less costly than the worsted system. Now, the worsted system is much more expensive and requires a greater number of processes, roughly speaking, say in the neighborhood of 16 counts or numbers of sizes, whichever you choose to call them, and, for the woolens, say roughly in the neighborhood of 5. The wools required for the worsted system are those of greater length than for the carding system, although what one manufacturer would use for a clothing wool and spin it on the woolen system, another would use on the worsted system. Our combing wools can be divided roughly into three classes according to length, and that classification is based more on the requirement and the ability of the various combs to manipulate the stock. We originally had, in the first place only the square knit comb, only capable of handling long staple wool, 8 inches or over. In the process of combing, the short fibres under the desired length, were rejected and cast aside, taking with them various vegetable matter. Only the long fibres were placed in what was known as the top and gradually reduced into a worsted thread and woven into the cloth. The woolen yarn is such that it requires shorter fibres. The position of the fibres in the thread is more of a criss-cross nature. The surface of the fibre is not clean cut, such as is found with a worsted yarn. The worsted yarn shows the fibres parallel. That is taken care of in the worsted comb. The fibres lie parallel with one another and are what is known as equalized. The fibres are distributed so as to show a perfectly smooth, symmetrical yarn or thread. The woolen thread has a soft, spongy feeling and is placed in the goods in the filling process and the face of the goods is covered up after they are woven in the finishing process, in many cases being teazled. In the worsted goods we usually show a clear cut face, each individual thread being distinguished and the weave clear cut. Such a typical fabric would be a worsted serge, ordinary blue serge. Many of you are probably wearing such a fabric.

Getting back to the worsted comb in the three types of wool, after the Noble comb was invented, it was found that it would treat shorter staple wools and that broke down the long wools of England known as the Leicester and placed the medium or Down wools under the combing class; they became known then as half-combing wools; in other words, we then came along to probably 25 years ago when with improvements to the Noble comb, it was able to treat fibre down to 2½ inches, and later than that, along came the adaptation of the Hyman or French comb, originally invented for combing cottons, to treat wools 2½ inches and under in length. So today you can say that any wool even running and regular and of comparatively good fineness of staple, can be combed and the distinction between combing and carding wools has been broken down, as formerly understood. Now, there is a general distinction held today between carding and combing wools; it is a matter of difference of opinion between various men; there is no established limitation or length to divide them; it depends altogether on the requirements of the mill itself.

I will not detain you much longer, but will just say a word or two about the construction of the wool fibre, and that is this; the outer surface consists of a number of scales or serrations which give the fibre its shrinking property and also its spinning property. The middle section, which is known as the cortex or cordical layer consists of a number of elongated cells. This is what furnishes its strength and elasticity. The center of the fibre is what is known as the pith or core, the technical name being the medula. This channel is the one which furnishes the juices from the skin and glands to nourish the fibre. The nearer the wool approaches hair, the larger this central channel becomes, and the fewer the serrations or scales on the outer surface become. That is one of the chief reasons which shows you that a fine wool has greater spinning properties than a longer wool, because, generally speaking, we have a rule which states that the longer the fibre the coarser the diameter, and the shorter the fibre, the finer the diameter. Now that rule has been broken down a little by breeding, which is shown in your Delaine wools of three-quarters and full blood quality. Now then, just a word as to the breeds themselves, and then I will be ready to start. The generally accepted theory in the first place was that full blood wool came from a full blood Merino sheep, and that is true today. Three-quarters blood was supposed to come from a cross-bred sheep which contained three-fourths Merino blood, and half Merino wool from a sheep which contained half Merino blood. Those barriers have been broken down and we find it possible to secure half blood wool from a Southdown or Dorset sheep which has never seen a Merino sheep, which is grown in the British Isles where there are no Merino sheep, so that classification and grades today does not hold true according to the terms or names given to the cross-breeding of sheep, and they only represent today grade terms which have become generally accepted in the trade and represent the relative fineness of the various grades of wool and are only recognized as such. Those grades vary with the different sections of the country; in other words, Boston is known as the finest wool grading market in the country, and what they would term a three-eighths blood wool in Boston might be known in Philadelphia as a low half blood, and so on down the line. Now, if the operator is ready and Mr. Drew will turn the lights out, we will try to start this picture.

(The moving pictures relating to the wool industry were then shown).

APPENDIX

APPENDIX.

List of Publications of the Pennsylvania Department of Agriculture.

ANNUAL REPORTS

*Report of the State Board of Agriculture, 336 pages, 1877.
*Report of the State Board of Agriculture, 625 pages, 1878.
*Report of the State Board of Agriculture, 560 pages, 1879.
*Report of the State Board of Agriculture, 557 pages, 1880.
*Report of the State Board of Agriculture, 646 pages, 1881.
*Report of the State Board of Agriculture, 645 pages, 1882.
*Report of the State Board of Agriculture, 645 pages, 1883.
*Report of the State Board of Agriculture, 648 pages, 1884.
*Report of the State Board of Agriculture, 645 pages, 1885.
*Report of the State Board of Agriculture, 646 pages, 1886.
*Report of the State Board of Agriculture, 650 pages, 1887.
*Report of the State Board of Agriculture, 648 pages, 1888.
*Report of the State Board of Agriculture, 650 pages, 1889.
*Report of the State Board of Agriculture, 594 pages, 1890.
*Report of the State Board of Agriculture, 600 pages, 1891.
*Report of the State Board of Agriculture, 640 pages, 1892.
*Report of the State Board of Agriculture, 713 pages, 1893.
*Report of the State Board of Agriculture, 646 pages, 1894.
*Report of the Department of Agriculture, 878 pages, 1895.
*Report of the Department of Agriculture, Part I, 820 pages, 1896.
*Report of the Department of Agriculture, Part 2, 444 pages, 1896.
*Report of the Department of Agriculture, Part. 1, 897 pages, 1897.
*Report of the Department of Agriculture, Part 2, 309 pages, 1897.
*Report of the Department of Agriculture, 894 pages, 1898.
*Report of the Department of Agriculture, Part 1, 1082 pages, 1899.
*Report of the Department of Agriculture, Part 2, 368 pages, 1899.
*Report of the Department of Agriculture, Part 1, 1010 pages, 1900.
*Report of the Department of Agriculture, Part 2, 348 pages, 1900.
*Report of the Department of Agriculture, Part 1, 1040 pages, 1901.
*Report of the Department of Agriculture, Part 2, 464 pages, 1901.
*Report of the Department of Agriculture, Part 2, 324 pages, 1902.
*Report of the Department of Agriculture, 958 pages, 1903.
*Report of the Department of Agriculture, 790 pages, 1904.
*Report of the Department of Agriculture, 846 pages, 1905.
*Report of the Department of Agriculture, 690 pages, 1906.
*Report of the Department of Agriculture, 565 pages, 1907.
*Report of the Department of Agriculture, 690 pages, 1908.
Report of the Department of Agriculture, 806 pages, 1909.
Report of the Department of Agriculture, 714 pages, 1910.
Report of the Department of Agriculture, 694 pages, 1911.
Report of the Department of Agriculture, 558 pages, 1912.
*Report of the Department of Agriculture, 684 pages, 1913.
*Report of the Department of Agriculture, 468 pages, 1914.
Report of the Department of Agriculture, 542 pages, 1915.
Report of the Department of Agriculture, —, pages, 1916.

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*Edition exhausted.

BULLETINS

No. 1.* Tabulated Analyses of Commercial Fertilizers, 24 pages, 1895.
No. 2.* List of Lecturers of Farmers' Institutes, 36 pages, 1895.
No. 3.* The Pure Food Question in Pennsylvania, 38 pages, 1895.
No. 4.* Tabulated Analyses of Commercial Fertilizers, 22 pages, 1896.
No. 5.* Tabulated Analyses of Commercial Fertilizers, 38 pages, 1896.
No. 6.* Taxidermy: How to Collect Skins, etc., 128 pages, 1896.
No. 7.* List of Creameries in Pennsylvania, 68 pages, 1896.
No. 8.* Report of State Horticultural Association, 108 pages, 1896.
No. 9.* Report of Dairymen's Association, 96 pages, 1896.
No. 10.* Prepared Food for Invalids and Infants, 12 pages, 1896.
No. 11.* Tabulated Analyses of Commercial Fertilizers, 22 pages, 1896.
No. 12.* Road Laws for Pennsylvania, 42 pages, 1896.
No. 13.* Report of Butter Colors, 8 pages, 1896.
No. 14.* Farmers' Institutes in Pennsylvania, 92 pages, 1896.
No. 15.* Good Roads for Pennsylvania, 42 pages, 1896.
No. 16.* Dairy Feeding as Practiced in Pennsylvania, 126 pages, 1896.
No. 17.* Diseases and Enemies of Poultry, 128 pages, 1896.
No. 18.* Digest of the General and Special Road Laws for Pennsylvania, 130 pages, 1896.
No. 19.* Tabulated Analyses of Commercial Fertilizers, 40 pages, 1896.
No. 20.* Preliminary Report of Secretary, 126 pages, 1896.
No. 21.* The Township High School, 24 pages, 1897.
No. 22.* Cider Vinegar of Pennsylvania, 28 pages, 1897.
No. 23.* Tabulated Analyses of Commercial Fertilizers, 31 pages, 1897.
No. 24.* Pure Food and Dairy Laws of Pennsylvania, 19 pages, 1897.
No. 25.* Farmers' Institutes in Pennsylvania, 8 pages, 1897.
No. 26.* Farmers' Institutes in Pennsylvania, 74 pages, 1897.
No. 27.* The Cultivation of American Ginseng, 23 pages, 1897.
No. 28.* The Fungous Foes of the Farmer, 19 pages, 1897.
No. 29.* Investigation in the Bark of Trees, 17 pages, 1897.
No. 30.* Sex in Plants, 17 pages, 1897.
No. 31.* The Economic Side of the Mole, 42 pages, 1898.
No. 32.* Pure Food and Dairy Laws, 30 pages, 1898.
No. 33.* Tabulated Analyses of Commercial Fertilizers, 42 pages, 1898.
No. 34.* Preliminary Report of the Secretary, 150 pages, 1898.
No. 35.* Veterinary Medicines, 23 pages, 1898.
No. 36.* Constitutions and By-Laws, 73 pages, 1898.
No. 37.* Tabulated Analyses of Commercial Fertilizers, 40 pages, 1898.
No. 38.* Farmers' Institutes in Pennsylvania, 8 pages, 1898.
No. 39.* Farmers' Institutes in Pennsylvania, 88 pages, 1898.
No. 40.* Questions and Answers, 206 pages, 1898.
No. 41.* Preliminary Reports of the Department, 189 pages, 1899.
No. 42.* List of Creameries in Pennsylvania, 88 pages, 1899.
No. 43. The San Jose Scale and other Scale Insects, 22 pages, 1899.
No. 44.* Tabulated Analyses of Commercial Fertilizers, 62 pages, 1899.
No. 45. Some Harmful Household Insects, 13 pages, 1899.
No. 46.* Some Insects Injurious to Wheat, 24 pages, 1899.
No. 47.* Some Insects Attacking Fruits, etc., 19 pages, 1899.
No. 48.* Common Cabbage Insects, 14 pages, 1899.
No. 49. Methods of Protecting Crops, etc., 20 pages, 1899.
No. 50.* Pure Food and Dairy Laws of Pennsylvania, 33 pages, 1899.
No. 51.* Tabulated Analyses of Commercial Fertilizers, 69 pages, 1899.
No. 52.* Proceedings Spring Meeting of Round-up Meeting, Farmers' Institute Managers, etc., 296 pages, 1899.
No. 53.* Farmers' Institutes in Pennsylvania, 1899-1900, 94 pages, 1899.
No. 54.* Tabulated Analyses of Commercial Fertilizers, 163 pages, 1899.
No. 55. The Composition and Use of Fertilizers, 126 pages, 1899.
No. 56. Nursery Fumigation and the Construction and Management of the Fumigating House, 24 pages, 1899.
No. 57. The Application of Acetylene Illumination to Country Homes, 85 pages, 1899.
No. 58. The Chemical Study of the Apple and Its Products, 44 pages, 1899.
No. 59. Fungous Foes of Vegetable Fruits, 39 pages, 1899.
No. 60.* List of Creameries in Pennsylvania, 33 pages, 1899.
No. 61.* The Use of Lime in Pennsylvania Soils, 170 pages, 1900.
No. 62. A Summer's Work Abroad in School Grounds, Home Grounds, Play Grounds, Parks and Forests, 34 pages, 1900.
No. 63. A Course in Nature Study for Use in the Public Schools, 119 pages, 1900.
No. 64. Nature Study Reference Library for Use in the Public Schools, 22 pages, 1900.
No. 65. Farmers' Library List, 29 pages, 1900.

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*Edition not for general distribution.

No. 66.* Pennsylvania Road Statistics, 98 pages, 1900.
No. 67. Methods of Steer Feeding, 14 pages, 1900.
No. 68.* Farmers' Institutes in Pennsylvania, 90 pages, 1900.
No. 69.* Road Making Materials of Pennsylvania, 104 pages, 1900.
No. 70.* Tabulated Analyses of Commercial Fertilizers, 97 pages, 1900.
No. 71. Consolidation of Country Schools and the Transportation of Scholars by the use of Vans, 89 pages, 1900.
No. 72.* Tabulated Analyses of Commercial Fertilizers, 170 pages, 1900.
No. 73. Synopsis of the Tax Laws of Pennsylvania, 132 pages, 1901.
No. 74.* The Repression of Tuberculosis of Cattle by Sanitation, 24 pages, 1901.
No. 75.* Tuberculosis of Cattle, and the Pennsylvania Plan for its Repression, 263 pages, 1901.
No. 76. Co-operative Investigation into the Agricultural Seed Supply of Pennsylvania, 50 pages, 1901.
No. 77.* Bee Culture, 101 pages, 1901.
No. 78.* List of County and Local Agricultural Societies, 10 pages, 1901.
No. 79. Rabies, 28 pages, 1901.
No. 80.* Decisions of the Department of Agriculture on the Pure Food Act of 1895, 30 pages, 1901.
No. 81. Concentrated Commercial Feeding Stuffs in Pennsylvania, 136 pages, 1901.
No. 82.* Containing the Law Creating a Department of Agriculture in Pennsylvania, and giving the Various Acts of Assembly Committed to the Department for Enforcement: Together with Decisions and Standards Adopted with Reference to the Pure Food Act of 1895, 90 pages, 1901.
No. 83.* Tabulated Analyses of Commercial Fertilizers, 132 pages, 1901.
No. 84. Methods of Steer Feeding; the Second Year of Co-operative Experiment by the Pennsylvania State Department of Agriculture and the Pennsylvania State College Agricultural Experiment Station, 16 pages, 1901.
No. 85.* Farmers' Institutes of Pennsylvania, 102 pages, 1901.
No. 86.* Containing a Complete List of Licenses granted by the Dairy and Food Commissioner, from January 1, 1901, to July 1, 1901, etc., 422 pages, 1901.
No. 87.* Giving Average Composition of Feeding Stuffs, 42 pages, 1901.
No. 88.* List of Creameries in Pennsylvania, 33 pages, 1901
No. 89.* Tabulated Analyses of Commercial Fertilizers, 195 pages, 1901.
No. 90. Treatment of San Jose Scale in Orchard and Nursery, 33 pages, 1902.
No. 91. Canning of Fruits and Vegetables, 57 pages, 1902.
No. 92.* List of Licenses Granted by the Dairy and Food Commissioner, 193 pages, 1902.
No. 93.* The Fundamentals of Spraying, 35 pages, 1902.
No. 94. Phosphates—Phosphatic or Phosphoric Acid Fertilizers, 87 pages, 1902.
No. 95.* County and Local Agricultural Societies, 12 pages, 1902.
No. 96. Insects Injurious to Cucurbitaceous Plants, 31 pages, 1903.
No. 97. The Management of Greenhouses, 41 pages, 1902.
No. 98. Bacteria of the Soil in Relation to Agriculture, 88 pages, 1902.
No. 99. Some Common Insect Pests of the Farmer, 32 pages, 1902.
No. 100.* Containing Statement of Work of Dairy and Food Division from January 1, 1902, to June 30, 1902, 233 pages, 1902.
No. 101.* Tabulated Analyses of Commercial Fertilizers, 137 pages, 1902.
No. 102. The Natural Improvement of Soils, 50 pages, 1902.
No. 103.* List of Farmers' Institutes of Pennsylvania, 67 pages, 1902.
No. 104. Modern Dairy Science and Practice, 127 pages, 1902.
No. 105.* Potato Culture, 96 pages, 1902.
No. 106. The Varieties of Fruit that can be Profitably Grown in Pennsylvania, 50 pages, 1902.
No. 107.* Analyses of Concentrated Commercial Feeding Stuffs, 62 pages, 1903.
No. 108. The Hessian Fly (never printed).
No. 109.* Tabulated Analyses of Commercial Fertilizers, 208 pages, 1903.
No. 110.* Containing Statement of Work of Dairy and Food Division from July 1, to December 31, 1903, 248 pages, 1903.
No. 111.* Small Fruits, Their Origin, Culture and Marketing, 66 pages, 1903.
No. 112.* List of County and Local Agricultural Societies, 10 pages, 1903.
No. 113. Methods of Milking, 96 pages, 1903.
No. 114.* Tabulated Analyses of Commercial Fertilizers, 116 pages, 1903.
No. 115. Proceedings of Annual Meeting of Farmers' Institute Managers and Lecturers, 210 pages, 1903.
No. 116.* Farmers' Institutes in Pennsylvania, Season of 1903-1904, 64 pages, 1903.
No. 117. Potash Fertilizers—Sources and Methods of Application, 46 pages, 1903.
No. 118.* Containing the Laws Creating the Office of Dairy and Food Commissioner in Pennsylvania, and also a Digest of the Act of Assembly Committed to his Administration, 62 pages, 1903.
No. 119.* Tabulated Analyses of Commercial Fertilizers, 115 pages, 1903.
No. 120. The Apple-tree Tent-caterpillar, 46 pages, 1903.
No. 121. Address of Hon. Joseph W. Hunter, State Highway Commissioner, Delivered at Annual Meeting of State Board of Agriculture, January 28, 1904, 16 pages, 1903.

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No. 122.* Analyses of Concentrated Commercial Feeding Stuffs, 52 pages, 1904.
No. 123.* Chestnut Culture, 50 pages, 1904.
No. 124.* County and Local Agricultural Fairs, 10 pages, 1904.
No. 125. The Source and Nature of Bacteria in Milk, 41 pages, 1904.
No. 126.* Tabulated Analyses of Commercial Fertilizers, January 1, to August 1, 140 pages, 1904.
No. 127.* Farmers' Institutes in Pennsylvania, 71 pages, 1904.
No. 128. Grape Culture, 62 pages, 1904.
No. 129. Alfalfa Culture in Humid Land, 64 pages, 1904.
No. 130. The Cow-pea in the North, 41 pages, 1904.
No. 131. Proceedings, State Board of Agriculture and Farmers' Normal Institute, 260 pages, 1904.
No. 132.* Analyses of Commercial Fertilizers, August 1, to December 31, 70 pages, 1904.
No. 133. The Improvement of Corn in Pennsylvania, 76 pages, 1904.
No. 134. Proceedings of the Twenty-eighth Annual Meeting of the State Board of Agriculture, 152 pages, 1905.
No. 135.* Analyses of Concentrated Feeding Stuffs, 41 pages, 1905.
No. 136.* List of County and Local Agricultural Societies, 8 pages, 1905.
No. 137. Procedings, Spring Meeting State Board of Agriculture and Farmers' Annual Normal Institute, 216 pages, 1905.
No. 138.* Analyses Concentrated Commercial Fertilizers, January 1, to August 1, 106 pages, 1905.
No. 139.* Farmers' Institutes in Pennsylvania, 1905-1906, 93 pages, 1905.
No. 140. Sheep Husbandry, 69 pages, 1905.
No. 141.* Laws Relating to the Dairy and Food Division, 47 pages, 1905.
No. 142.* Analyses Concentrated Commercial Fertilizers, August 1, to December 31, 61 pages, 1905.
No. 143. Poultry in Pennsylvania, 36 pages, 1906.
No. 144. Proceedings of 29th Annual Meeting State Board of Agriculture, 191 pages, 1906.
No. 145.* Commercial Feeding Stuffs in Pennsylvania, 51 pages, 1906.
No. 146.* List of County and Local Agricultural Societies, 10 pages, 1906.
No. 147. Market Gardening, 53 pages, 1906.
No. 148. Report of Bee-Keepers' Association of Pennsylvania, 57 pages, 1906.
No. 149.* Analyses Commercial Fertilizers, January 1, August 1, 1906, 80 pages, 1906.
No. 150.* Farmers' Institutes in Pennsylvania, for the year 1906-1907, 73 pages, 1906.
No. 151. Proceedings Spring Meeting of State Board of Agriculture and Farmers' Annual Normal Institute, 190 pages, 1906.
No. 152. Fruits of Pennsylvania, 330 pages, 1906.
No. 153.* Analyses Commercial Fertilizers, August 1, December 31, 1906, 60 pages, 1906.
No. 154. Proceedings State Board of Agriculture for 1907, 158 pages, 1907.
No. 155.* Commercial Feeding Stuffs of Pennsylvania for 1906, 47 pages, 1907.
No. 156.* List of County and Agricultural Fairs for 1907, 10 pages, 1907.
No. 157. Proceedings of Farmers' Normal Institute and State Board of Agriculture, 210 pages, 1907.
No. 158.* Farmers' Institute for year 1907-1908, 78 pages, 1907.
No. 159.* Analyses of Commercial Fertilizers of Spring Samples, 69 pages, 1907.
No. 160.* Laws Relating to Dairy and Food Division, 69 pages, 1907.
No. 161. Papers Read at Farmers' Institutes, 1906-1907, 124 pages, 1907.
No. 162. Breakfast Foods, 40 pages, 1907.
No. 163.* Analyses of Commercial Fertilizers from Fall Samples, 51 pages, 1907.
No. 164. Proceedings State Board of Agriculture, 1908, 210 pages, 1908.
No. 165.* List of County and Agricultural Fairs, 1908, 10 pages, 1908.
No. 166. Results of the Analyses of Paris Green, 6 pages, 1908.
No. 167.* Analyses of Commercial Feeding Stuffs, for 1907, 98 pages, 1908.
No. 168.* Preliminary Report Dairy and Food Commissioner, 50 pages, 1908.
No. 169. Proceedings Spring Meeting State Board of Agriculture and Annual Farmers' Normal Institute, 214 pages, 1908.
No. 170.* Farmers' Institutes for Season of 1908, 84 pages, 1908.
No. 171. Analyses of Commercial Fertilizers, January 1, to August 1, 1908, 74 pages, 1908.
No. 172. The Bang Method for the Repression of Tuberculosis in Cattle, 28 pages, 1908.
No. 173.* Analyses of Commercial Fertilizers, August 1, to December 31, 1908, 58 pages, 1908.
No. 174.* List of Fertilizer Manufacturers, 1909, 32 pages, 1909.
No. 175.* Analyses of Commercial Feeding Stuffs, 1908, 148 pages, 1909.
No. 176. Analyses of Paris Green, 1908, 31 pages, 1909.
No. 177. Proceedings State Board of Agriculture, 180 pages, 1909.
No. 178.* List of County and Local Agricultural Fairs, 10 pages, 1909.

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No. 179. Papers Read at Farmers' Institutes, 1907-1908, 105 pages, 1909.
No. 180.* Laws Dairy and Food Bureau 69 pages, 1909.
No. 181. Timely Hints to Horsebreeders, 23 pages, 1909.
No. 182. Proceedings Farmers' Annual Normal Institute and Spring Meeting State Board of Agriculture, 231 pages, 1909.
No. 183.* Report of Dairy and Food Bureau, 57 pages, 1909.
No. 184.* Farmers' Institutes for Pennsylvania, 1909, 79 pages, 1909.
No. 185.* Analyses of Commercial Fertilizers, January 1, to August 1, 1909, 87 pages, 1909.
No. 186.* Swine Husbandry, 127 pages, 1909.
No. 187. Directory of Stallions Registered with Pennsylvania Livestock Sanitary Board, for 1909, 86 pages, 1909.
No. 188.* Principles of Domestic Science, 42 pages, 1909.
No. 189.* Analyses of Commercial Fertilizers, August 1, to December 31, 1909, 71 pages, 1909.
No. 190.* The Potato: Selection of Seed and Cultivation, 62 pages, 1910.
No. 191.* List of Fertilizer Manufacturers and Brands Licensed for 1910, 38 pages, 1910.
No. 192. Analyses of Paris Green for 1909, 38 pages, 1910.
No. 193. Proceedings Thirty-third Annual Meeting State Board of Agriculture, 192 pages, 1910.
No. 194.* Preliminary Report, Dairy and Food Commissioner, 40 pages, 1910.
No. 195.* List of Agricultural Fairs for 1910, 10 pages, 1910.
No. 196. Commercial Feeding Stuffs of Pennsylvania for 1909, 186 pages, 1910.
No. 197. Proceedings Farmers' Annual Normal Institute and Spring Meeting of Board of Agriculture, 260 pages, 1910.
No. 198.* Farmers' Institutes in Pennsylvania, Season 1910-1911, 84 pages, 1910.
No. 199.* Tabulated Analyses of Commercial Fertilizers, Spring Samples, 72 pages, 1910.
No. 200. Skim-milk Cheese, 16 pages, 1910.
No. 201. Market Gardening, No. 2, 86 pages, 1910.
No. 202. Marketing Horticultural Products, 86 pages, 1910.
No. 203.* Tabulated Analyses of Commercial Fertilizers, Fall Samples, 76 pages, 1910.
No. 204. Analyses of Paris Green. 1910, 34 pages, 1910.
No. 205.* List of Fertilizer Manufacturers, 37 pages, 1911.
No. 206.* Preliminary Report Dairy and Food Bureau, 37 pages, 1911.
No. 207.* List County Fairs, 10 pages, 1911.
No. 208.* Analyses Commercial Feeding Stuffs, 213 pages, 1911.
No. 209.* Laws, Dairy and Food Bureau, 72 pages, 1911.
No. 210. Proceedings State Board of Agriculture, 208 pages, 1911.
No. 211. Report of Foot-and-Mouth Disease. (Aphthous Fever), 72 pages, 1911.
No. 212.* Analyses Commercial Fertilizers, (Spring), 11 pages, 1911.
No. 213. Proceedings Annual Normal Institute, 235 pages, 1911.
No. 214.* Schedule Farmers' Institutes, 1911-1912, 82 pages, 1911.
No. 215. List of Publications on Fruit Growing, 23 pages, 1911.
No. 216. Cheap Candy, 21 pages, 1911.
No. 217 Grape Culture for Pennsylvania,, 66 pages, 1911.
No. 218.* Analyses Commercial Fertilizers, (Fall), 77 pages, 1911.
No. 219. Increasing the Winter Yield of Eggs, 92 pages, 1912, (Third Edition).
No. 220.* List of Fertilizer Licenses Granted for 1912, 40 pages, 1912.
No. 221.* Preliminary Report of Dairy and Food Commissioner, 46 pages, 1912.
No. 222. Proceedings State Board of Agriculture, 190 pages, 1912.
No. 223. Analyses Commercial Feeding Stuffs for 1911, 172 pages, 1912.
No. 224. Commercial Table Syrups and Molasses, 98 pages, 1912.
No. 225. Report on Linseed Oil, 1911, 32 pages, 1912.
No. 226.* County and Local Agricultural Societies' Fairs, 1912, 10 pages, 1912.
No. 227.* List of Licensed Veterinarians in Pennsylvania, 1912, 36 pages, 1912.
No. 228.* Farmers' Institutes in Pennsylvania, Season 1912-1913, 70 pages, 1912.
No. 229. Proceedings Farmers' Annual Normal Institute, and Spring Meeting State Board of Agriculture, 206 pages, 1912,
No. 230. Analyses of Commercial Fertilizers, (Spring), 1912, 98 pages, 1912.
No. 231. Partial List of Owners and Breeders of Registered Livestock in Pennsylvania, with Registration of Stallions for 1910-1911, pages, 1912.
No. 232. Law Bulletin, Dairy and Food Bureau, 1912, 66 pages, 1912.
No. 233. Practical Side of Local Organization in Agriculture, 16 pages, 1912.
No. 234. Analyses Commercial Feeding Stuffs (1912), 227 pages, 1913.
No. 235. Beef Production, 250 pages, 1913.
No. 236. Linseed Oil Report (1912), 11 pages, 1913.
No. 237. List Fertilizer Manufacturers (1913), 40 pages, 1913.
No. 238. Proceedings Annual Meeting State Board of Agriculture, 210 pages, 1913.
No. 239. List County and Local Fairs, 1913, 10 pages, 1913.
No. 240. Supplementary Report, Dairy and Food Commissioner, 56 pages, 1913.
No. 241. Proceedings Farmers' Annual Normal Institute, 302 pages, 1913.

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*Edition not for general distribution.

No. 242. Analyses Commercial Fertilizers, 88 pages, 1913.
No. 243. Schedule Farmers' Institutes for Pennsylvania, 76 pages, 1913.
No. 244. Analyses Commercial Fertilizers, Fall, 65 pages, 1913.
No. 245. List of Fertilizer Manufacturers and Importers, for 1914, 40 pages, 1914.
No. 246. Proceedings State Board of Agriculture, 282 pages, 1914.
No. 247. Preliminary Report, Dairy and Food Bureau, 82 pages, 1914.
No. 248. County and Agricultural Fairs, 8 pages, 1914.
No. 249. Commercial Feeding Stuffs, 1913, 190 pages, 1914.
No. 250. Soils of Pennsylvania, Part One, 481 pages, 1914.
No. 251. Law Bulletin, Dairy and Food Bureau, 102 pages, 1914.
No. 252. Abandoned and Unoccupied Farms of Pennsylvania, 48 pages, 1914.
No. 253. Proceedings Farmers' Normal Institute, 190 pages, 1914.
No. 254. Farmers' Institutes of Pennsylvania for 1914, 72 pages, 1914.
No. 255. Analyses of Commercial Fertilizers, Spring, 1914, 94 pages, 1914.
No. 256. Creameries and Cheese Factories of Pennsylvania, 32 pages, 1914.
No. 257. Soils of Pennsylvania, Part Two, 286 pages, 1914.
No. 258. Seed Report, 1913, 36 pages, 1914.
No. 259. Commercial Fertilizers, Fall, 1914, 66 pages, 1914.
No. 260. List Fertilizer Licenses Granted for 1915, 29 pages, 1915.
No. 261. Sour Soils and Liming, 221 pages, 1915.
No. 262. Linseed Oil Report for 1914, 22 pages, 1915.
No. 263. Preliminary Report Dairy and Food Commissioner, 61 pages, 1915.
No. 264. Proceedings State Board of Agriculture, 328 pages, 1915.
No. 265. Analyses Commercial Feeding Stuffs, for 1914, 221 pages, 1915.
No. 266. List of Agricultural Societies and Schedule of Fairs, 9 pages, 1915.
No. 267. Proceedings Annual Normal Institute, 204 pages, 1915.
No. 268. Milk, Butter and Butter Making, 43 pages, 1915.
No. 269. Analyses Commercial Fertilizers, (Spring), 85 pages, 1915.
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